NASA SP-7011 (175)

NASA SP-7011(175) Aerospace Medicine and Biology Pages 319–349 JANUARY 1978

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 175)

JANUARY 1978

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges:

STAR (N-10000 Series)	N77-32072—N77-34092
IAA (A-10000 Series)	A77-47974—A77-51633

This bibliography was prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by Informatics Information Systems Company.

NASA SP-7011 (175)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 175)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in December 1977 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

Scientific and Technical Information Office JANUARY 1978
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Washington, D.C.

NASA SP-7011 and its supplements are available from the National Technical Information Service (NTIS). Questions on the availability of the predecessor publications, Aerospace Medicine and Biology (Volumes I - XI) should be directed to NTIS.

This Supplement is available from the National Technical Information Service (NTIS), Springfield, Virginia 22161, at the price code E02 ($4.75 domestic; $9.50 foreign).

INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 239 reports, articles and other documents announced during December 1977 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes -- subject and personal author -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1977 Supplements.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A77-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies are available at $5.00 per document up to a maximum of 20 pages. The charge for each additional page is 25 cents. Microfiche[1] are available at the rate of $1.50 per microfiche for documents identified by the # symbol following the accession number. A number of publications, because of their special characteristics, are available only for reference in the AIAA Technical Information Service Library. Minimum airmail postage to foreign countries is $1.00. Please refer to the accession number, e.g., (A77-10026), when requesting publications.

STAR ENTRIES (N77-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code followed by the letters HC or MF in the *STAR* citation. Price codes are given in the tables on page vii of the current issue of *STAR*.

Microfiche[1] is available regardless of age for those accessions followed by a # symbol.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Unit.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $3.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: ERDA Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Energy Research and Development Administration reports, usually in microfiche form, are listed in *Nuclear Science Abstracts*. Services available from the ERDA and its depositories are described in a booklet, *Science Information Available from the Energy Research and Development Administration* (TID-4550), which may be obtained without charge from the ERDA Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: ZLDI. Sold by the Zentralstelle für Luftfahrtdokumentation und -Information, Munich, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent Office. Sold by Commissioner of Patents, U.S. Patent Office, at the standard price of 50 cents each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

SUBSCRIPTION AVAILABILITY

This publication is available on subscription from the National Technical Information Service (NTIS). The annual subscription rate for the monthly supplements, excluding the annual cumulative index, is $ 45.00 domestic; $ 75.00 foreign. All questions relating to the subscriptions should be referred to NTIS.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics
and Astronautics
Technical Information Service
750 Third Ave.
New York, N.Y. 10017

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents
U.S. Patent Office
Washington, D.C. 20231

Energy Research and Development
Administration
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Space Documentation Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B. W. I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Office (NST-6)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration
Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

Zentralstelle für Luftfahrtdoku-
mentation und -Information
8 München 86
Postfach 880
Federal Republic of Germany

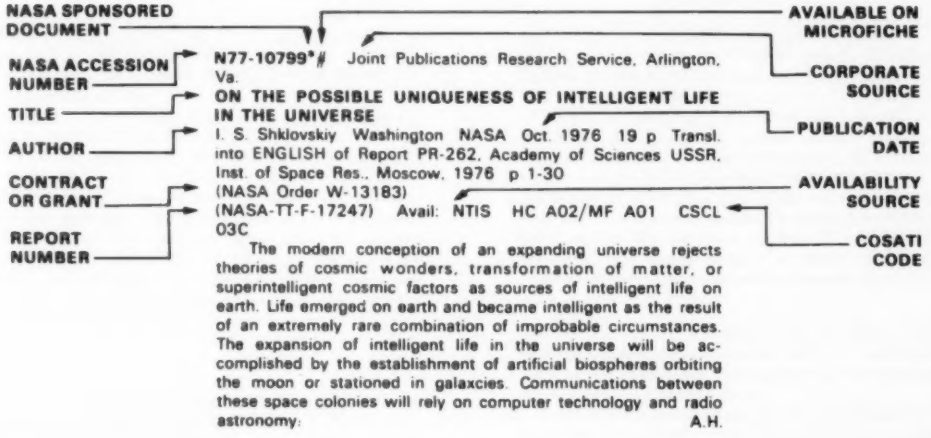
TABLE OF CONTENTS

Page

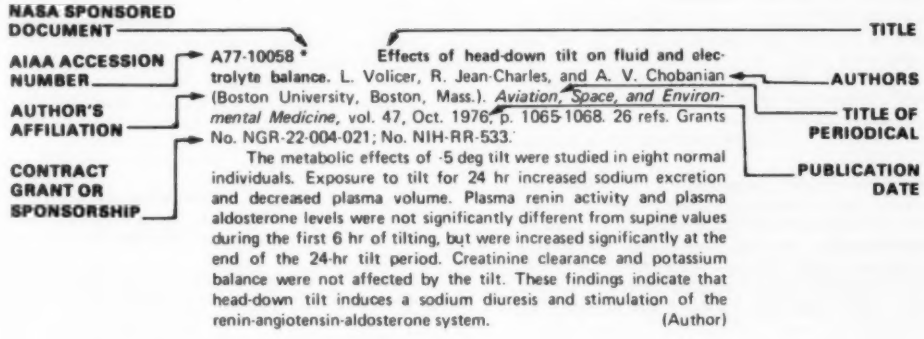
IAA Entries (A77-10000) 319
STAR Entries (N77-10000) 335

Subject Index I-1
Personal Author Index I-25

TYPICAL CITATION AND ABSTRACT FROM *STAR*


NASA SPONSORED DOCUMENT
NASA ACCESSION NUMBER
TITLE
AUTHOR
CONTRACT OR GRANT
REPORT NUMBER
AVAILABLE ON MICROFICHE
CORPORATE SOURCE
PUBLICATION DATE
AVAILABILITY SOURCE
COSATI CODE
N77-10799*# Joint Publications Research Service, Arlington, Va.
ON THE POSSIBLE UNIQUENESS OF INTELLIGENT LIFE IN THE UNIVERSE
I. S. Shklovskiy Washington NASA Oct. 1976 19 p Transl. into ENGLISH of Report PR-262, Academy of Sciences USSR, Inst. of Space Res., Moscow, 1976 p 1-30
(NASA Order W-13183)
(NASA-TT-F-17247) Avail: NTIS HC A02/MF A01 CSCL 03C
The modern conception of an expanding universe rejects theories of cosmic wonders, transformation of matter, or superintelligent cosmic factors as sources of intelligent life on earth. Life emerged on earth and became intelligent as the result of an extremely rare combination of improbable circumstances. The expansion of intelligent life in the universe will be accomplished by the establishment of artificial biospheres orbiting the moon or stationed in galaxies. Communications between these space colonies will rely on computer technology and radio astronomy. A.H.

TYPICAL CITATION AND ABSTRACT FROM *IAA*


NASA SPONSORED DOCUMENT
AIAA ACCESSION NUMBER
AUTHOR'S AFFILIATION
CONTRACT GRANT OR SPONSORSHIP
TITLE
AUTHORS
TITLE OF PERIODICAL
PUBLICATION DATE
A77-10058 * Effects of head-down tilt on fluid and electrolyte balance. L. Volicer, R. Jean-Charles, and A. V. Chobanian (Boston University, Boston, Mass.). Aviation, Space, and Environmental Medicine, vol. 47, Oct. 1976, p. 1065-1068. 26 refs. Grants No. NGR-22-004-021; No. NIH-RR-533.
The metabolic effects of -5 deg tilt were studied in eight normal individuals. Exposure to tilt for 24 hr increased sodium excretion and decreased plasma volume. Plasma renin activity and plasma aldosterone levels were not significantly different from supine values during the first 6 hr of tilting, but were increased significantly at the end of the 24-hr tilt period. Creatinine clearance and potassium balance were not affected by the tilt. These findings indicate that head-down tilt induces a sodium diuresis and stimulation of the renin-angiotensin-aldosterone system. (Author)

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 175)

JANUARY 1978

IAA ENTRIES

A77-47991 **Hormonal changes under altitude stress.** H. D. Brahmachari (Defence Research and Development Establishment, Gwalior, India), S. Joseph (Defence Laboratory, Jodhpur, India), K. Ramachandran, and U. Radhakrishnan (Defence Institute of Physiology and Allied Sciences, Delhi, India). *Defence Science Journal*, vol. 27, Apr. 1977, p. 99-104. 59 refs.

The separate effects of exposure for six hours to cold (8 C), hypoxia (4267 m) and simulated altitude (8 C at 4267 m) have been studied on ten human subjects in a decompression chamber, with respect to the changes in blood cortisol, antidiuretic hormone and urinary catecholamines. Changes in blood cortisol, protein-bound iodine, antidiuretic hormone urinary excretion of 17-ketosteroids and urine volume have been recorded on another ten subjects following acute exposure to high altitude (3505 m). Changes in the same parameters, together with urinary testosterone level, have been recorded on another 20 subjects following two years of exposure to high altitude (3505 m). The results are discussed. (Author)

A77-48022 **Adaptation to displaced vision - Evidence for transfer of adaptation and long-lasting aftereffects.** B. R. Yachzel and J. R. Lackner (Brandeis University, Waltham, Mass.). *Perception and Psychophysics*, vol. 22, no. 2, Aug. 1977, p. 147-151. 16 refs. Research supported by the Rosenstiel Biomedical Sciences Foundation and Spencer Foundation.

Aftereffects following a single exposure to visual rearrangement last for 48 h and longer. Following multiple spaced exposures to visual rearrangement, aftereffects persisted for at least 2 weeks. Over the course of the multiple exposures, subjects showed diminished scatter when pointing without sight of hand to visual targets but did not show diminished constant errors. Adaptation achieved in one visuomotor transferred nearly perfectly to a test situation involving somewhat different movement demands. (Author)

A77-48023 **Is the discrimination of motion-path length unique.** W. Epstein and S. Hanson (Wisconsin, University, Madison, Wis.). *Perception and Psychophysics*, vol. 22, no. 2, Aug. 1977, p. 152-158. 7 refs.

Discrimination of the extent of a motion path may present a special problem since the discrimination calls on memory for changing position and involves pursuit movements of the eye. To determine how these factors affect judgment, discrimination of extents represented by motion paths, successively appearing endpoints, and simultaneously present endpoints was compared under a variety of eye-movement conditions: fixation, pursuit, and saccadic. Discrimination was assessed by the method of adjustment and also by the method of magnitude estimation. Discrimination of motion path extent was found to be as accurate as discrimination of an interspace demarcated by simultaneously presented points or by successively presented points. This was true for brief single presentations of the extents as well as for repeated exposures to the extents. The findings were applied to the analysis of the perception of velocity and the perception of extent. (Author)

A77-48024 **Delay of stimulus presentation after the saccade in visual search.** J. Vaughan and T. M. Graefe (Hamilton College, Clinton, N.Y.). *Perception and Psychophysics*, vol. 22, no. 2, Aug. 1977, p. 201-205. 12 refs. Grant No. NIH-MH-26303.

Delay of stimulus onset after each saccade in visual search decreased oculomotor and manual reaction times, with a greater effect occurring for the oculomotor response. The saccadic oculomotor reaction might have been facilitated in three ways: by the facilitation of reaction with a foreperiod warning stimulus, by the attenuation of saccadic suppression effects due to the stimulus onset delay, or by the use of a strategy of preprogramming fixation durations. The results support a model of visual search using preprogrammed control of visual fixation durations. (Author)

A77-48025 **Perceived size and distance as a perceptual conflict between two processing modes.** A. Higashiyama (Osaka City University, Osaka, Japan). *Perception and Psychophysics*, vol. 22, no. 2, Aug. 1977, p. 206-211. 21 refs.

Three different sized squares were successively presented at the same physical distance under three observational conditions which provided different information about distance in the visual field. The 60 observers in each observational condition were asked to give verbal absolute judgments of perceived size and perceived distance for each of the squares. The results showed that in a full-cue situation a ratio of perceived absolute sizes is equal to that of the corresponding visual angles, with perceived distances appearing equal to each other; in a reduced-cue situation an object of smaller perceived size is judged to be farther away than one of larger perceived size, with the observers tending to assume the two objects as the same object or identically sized objects. These results were analyzed in terms of the perceptual conflict between primary perception and secondary perception. (Author)

A77-48034 # **Chlorophyll derivatives in modern soils in relation to the problem of the chemical evolution and origin of life on earth (Proizvodnye khlorofilla v sovremennykh pochvakh v sviazi s problemoi khimicheskoi evoliutsii i proiskhozhdeniia zhizni na zemle).** M. P. Kolesnikov and I. A. Egorov (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 235, July 1, 1977, p. 228-231. 11 refs. In Russian.

A77-48320 # **Muscular control during some voluntary motions with one degree of freedom. II - Multiple motions (Upravlenie myshtsami pri vypolnenii nekotorykh proizvol'nykh dvizhenii s odnoi stepen'iu svobody. II - Mnogokratnye dvizheniia).** A. I. Litvintsev and N. S. Seropian. *Avtomatika i Telemekhanika*, July 1977, p. 109-121. In Russian.

Experimental results on the control of human wrist-joint muscles during rapid multiple motions with one degree of freedom are discussed. These motions were triple cyclic motions and periodic rockings, carried out at maximum frequency at a given amplitude and an unspecified duration of rocking. The experimental method involved the sudden braking of the motion by fixing the joint with an electromagnet. Comparative electromyographic data are used to determine which type of control (commands generated by the CNS or by feedbacks) conditions each type of muscular activity. B.J.

A77-48417 * **Recovery from exercise at varying work loads - Time course of responses of heart rate and systolic intervals.** P. S. Nandi (Lemuel Shattuck Hospital, Boston, Mass.) and D. H. Spodick (Tufts University, Boston, Mass.). *British Heart Journal*, vol. 39, Sept. 1977, p. 958-966. 28 refs. NASA-supported research.

The time course of the recovery period was characterized by noninvasive measurements after 4 minute bicycle exercise at 3 separate work loads in volunteers with normal peak responses. Most responses started immediately to return toward resting control values. Left ventricular ejection time and stroke volume change are discussed. Changes in pre-ejection period were determined by changes in isovolume contraction time, and factors affecting the degree and rate of return are considered. The rates of change in the ejection time index and in the ratio pre-ejection period/left ventricular ejection time were virtually independent of load throughout most of recovery. M.L.

A77-48418 **Distortion of non-invasive cardiac pulse curves - A capillary-damped pick-up and a calibration unit for apex cardiograms and other pulse curves.** J. Wikstrand, K. Nilsson, and I. Wallentin (Sahlgren's Hospital; Goteborgs Universitet, Goteborg; Siemens-Elema AB, Solna, Sweden). *British Heart Journal*, vol. 39, Sept. 1977, p. 995-1005. 13 refs. Research supported by the Swedish National Association against Heart and Chest Diseases and Bank of Sweden Tercentenary Fund; Swedish Medical Research Council Grants No. K73-19X-X4131-01; No. B74-19X-4229-01A.

A77-48461 // **Some aspects of the clinical training of aviation physicians (Nekotorye voprosy klinicheskoi podgotovki aviatsionnykh vrachei).** L. M. Dubrovin. *Voenno-Meditsinskii Zhurnal*, July 1977, p. 22-24. In Russian.

Some disorders common among aviators are summarized, and the experience that doctors obtain at a clinic devoted to treating aviators is described. Health requirements for aviators are considered. The emphases of the training program are examined with attention to the application of a general medical training to aviation-specific problems. M.L.

A77-48462 // **The functional state of an organism subjected to general low-frequency vibrations and impact acceleration (Funktsional'noe sostoianie organizma pri vozdeistvii obshchei nizkochastotnoi vibratsii i udarnykh uskorenii).** N. S. Petrov and P. O. Viazitskii. *Voenno-Meditsinskii Zhurnal*, July 1977, p. 53-56. In Russian.

Male subjects between 22 and 30 years of age were subjected to 7-8 Hz vibrations for periods of at least three days, and the physiological effects of this treatment are described. Decreased loading of the left ventricle, increased activity of the sympathetic-adrenal system, and a reduction of mineralo-corticoid function were observed. The effects of horizontally delivered impact accelerations on male subjects were also studied. Changes in the circulation system and in blood catechol levels are described. M.L.

A77-48463 // **The significance of a psychophysiological norm for flying time for the medical safeguarding of flights (Znachenie psikhofiziologicheskogo normirovaniia letnoi nagruzki v meditsinskom obespechenii poletov).** V. F. Zhernavkov and P. M. Shalimov. *Voenno-Meditsinskii Zhurnal*, July 1977, p. 60-64. In Russian.

A77-48464 // **The effect of prolonged hypokinesis on the function of the auditory analyzer (Vliianie dlitel'noi gipokinezii na funktsiiu slukhovogo analizatora).** A. I. Vasil'ev and V. V. Diskalenko. *Voenno-Meditsinskii Zhurnal*, July 1977, p. 76, 77. In Russian.

Male subjects were kept horizontally immobilized in bed, and the effect of this hypokinesis on hearing was studied. The increase in the auditory threshold for both air and bone transmission was more pronounced at 10 days than after 30 or 48 days of hypokinesis. Subjects who received pharmacological preparations designed to help maintain normal water-salt and protein metabolism showed a reduced diminution of hearing in air at 10 days. Changes in the loudness discomfort level and in the sensitivity to supersonic sounds were also studied. M.L.

A77-48479 // **Ontogenetic features of the reaction of adrenergic systems to hypergravity (Ontogeneticheskie osobennosti reaktivnosti adrenergicheskikh sistem na deistvie gipergravitatsii).** A. S. Dmitriev, L. A. Leontiuk, and A. A. Pushkarchuk (Akademiia Nauk Belorusskoi SSR, Institut Fiziologii, Minsk, Belorussian SSR). *Akademiia Nauk BSSR, Doklady*, vol. 21, July 1977, p. 655-658. 15 refs. In Russian.

The paper presents experimental data which indicate that during development the adrenal systems of animals respond to hypergravity effects. Biochemical and histochemical studies show that animals grown in centrifuges rotating at a constant speed are characterized by an earlier morphological-functional maturation of the sympathetic adrenal systems and that these systems participate in the response to acceleration. Differences were detected in the responses of the mother and young to acceleration effects. M.L.

A77-48481 **Effect of heparin-induced free fatty acid elevation on myocardial oxygen consumption in man.** W. J. Rogers, H. G. McDaniel, R. E. Moraski, C. E. Rackley, and R. O. Russell, Jr. (Alabama, University, Medical Center; U.S. Veterans Administration Hospital, Birmingham, Ala.). *American Journal of Cardiology*, vol. 40, Sept. 1977, p. 365-372. 52 refs. Grants No. PHS-1-P17-HL-17667-02; No. NIH-HL-11310; No. NIH-T01-LM-00154; No. NIH-M01-RR-00032-13. USVA Project 5566-01.

Metabolic studies of 17 patients were used in analyzing the effect of the elevation of plasma free fatty acids on myocardial oxygen consumption in man. Serial measurements of coronary sinus blood flow, heart rate and aortic blood pressure, as well as arterial and coronary determinations of oxygen, carbon dioxide, glycerol and free fatty acids were made both before and after administrations of heparin, which elevates free fatty acid concentrations in the blood. Some of the subjects also ingested doses of fat. Hemodynamic variables recorded 30 minutes following ingestion of the heparin and/or fat were found to be unchanged from the earlier readings. Furthermore, no effect on myocardial oxygen consumption was noted, apparently because the excess free fatty acids were stored as triglycerides rather than oxidized. J.M.B.

A77-48491 **Learning process and nonlinear behavior of human operators in stabilizing unstable systems.** K. Ito and M. Ito (Nagoya University, Nagoya, Japan). *Electrical Engineering in Japan*, vol. 96, Sept.-Oct. 1976, p. 143-149. 9 refs. Translation.

The learning process of human operators stabilizing unstable quadratic oscillation systems is studied, with the aim of describing the nature of human response in human-machine interaction. The experimental procedure which involves generation of an unstable quadratic oscillation subject to varying degrees of human control, is discussed; control responses having small, large, or a combination of amplitudes are characterized. A sequence of actions describing the generalized control response is also given. Large, apparently nonlinear control responses are found in some parts of the learning process. However, this nonlinearity may be associated with functions other than error reduction, and tends to converge to stable linear action. J.M.B.

Psychophysiological reactions of pilots operating training simulators were determined at several stages of the flight and after different numbers of flights. The use of these data to establish a norm for flying time is considered. After three flights within a shift, stricter norms were required to determine a pilot's ability to continue at a high level of performance. A medical inspection is recommended after four flights for assessing the pilot's ability to continue. Factors contributing to exhaustion and the consequences of exhaustion are examined. M.L.

A77-49182 The exercise electrocardiogram in diagnosis. H. Blackburn (Minnesota, University, Minneapolis, Minn.). *Cardiology*, vol. 62, no. 3, 1977, p. 190-205. 17 refs.

The exercise electrocardiographic (ECG) stress test is evaluated with regard to its value in diagnosis, limitations, and variety of uses. Several factors determining ECG responses to exercise are discussed along with reasons other than coronary artery disease which contribute to ischemic-type exercise responses in the electrocardiogram (false-positive and false-negative exercise tests). Some of the causes of discrepancies in the diagnostic power of exercise ECG response are identified, such as population differences, diagnostic criteria used, and observer variation. The National Institutes of Health study of ECG is reviewed as are more recent evaluations with reference to ECG diagnosis, functional testing, and prognostic power including the ischemic response. Specific needs for further research of the ECG are outlined along with a summary of the present status of its diagnostic applicability and comments regarding professional attitudes toward the method. S.C.S.

A77-49222 Limited vocabulary natural language dialogue. M. J. Kelly (Illinois, University, Savoy, Ill.) and A. Chapanis (Johns Hopkins University, Baltimore, Md.). *International Journal of Man-Machine Studies*, vol. 9, July 1977, p. 479-501. 20 refs.

An experiment aimed at assessing the effect of using limited natural language vocabularies in problem solving is reported. The experiment involved two-person teams working at realistic problem-solving tasks by communication through a teletypewriter system. One third of the teams used a limited vocabulary of 300 words, one third used a 500-word vocabulary, and the last third was given no vocabulary restrictions. Times needed to solve the problems, measures of verbal output, errors made by teams using the restricted vocabularies, and measures of overt behavior were recorded. It was found that subjects working with the limited vocabularies solved the problems as successfully as their counterparts using the unrestricted vocabulary. Development of limited-vocabulary natural languages for effective man-computer communications is also discussed. J.M.B.

A77-49223 The controller and automation. V. D. Hopkin. *The Controller*, vol. 16, Aug. 1977, p. 7, 11, 12.

The introduction of computer automation into air traffic control is discussed. It is suggested that with tasks of a higher order it may be difficult to evaluate what factors have been taken into account in the computer-derived solution, noting that there may be a decrease in job satisfaction with greater automation. Among the advantages of computer-assisted air traffic control are: reduction of routine tasks, increase in data handling capacity, and greater workload control. Disadvantages are also reviewed, such as: reduction of possible alternative actions, reduction of actions initiated by the controller, and remoteness from the actual task. It is concluded that although automation is a valuable tool in handling data and fulfilling routine functions, when applied to tasks normally associated with skill, job satisfaction, and interest, the possibility for adverse effects exists. S.C.S.

A77-49261 Renin, aldosterone, electrolyte, and cortisol responses to hypoxic decompression. J. R. Sutton, G. W. Viol, G. W. Gray, M. McFadden, and P. M. Keane (McMaster University, Hamilton, Ontario; Defence and Civil Institute of Environmental Medicine, Toronto, Canada). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 43, Sept. 1977, p. 421-424. 30 refs.

Responses of plasma renin activity, plasma aldosterone, plasma cortisol, and plasma electrolyte concentration and urinary electrolyte and aldosterone excretion were studied in four men during hypoxic decompression to a simulated altitude of 4,760 m in a pressure chamber. Three of the four subjects developed significant acute mountain sickness. Plasma sodium and potassium concentrations were unchanged. No significant change in plasma renin activity was observed, but values tended to fall. Plasma aldosterone concentration was depressed while plasma cortisol was elevated and diurnal variation lost. Urinary sodium excretion was unchanged, but urinary potassium and aldosterone excretion were decreased. The decrease in plasma and urinary aldosterone and urinary potassium in the absence of change in plasma renin activity or plasma potassium is of uncertain origin. It is unlikely to be due to a decrease in adrenocorticotropin secretion since plasma cortisol rose during the same time. None of the changes could be causally implicated in the development of acute mountain sickness although the increase in plasma cortisol was greatest in the most ill. (Author)

A77-49262 Correlation between ventilatory and cerebrovascular responses to inhalation of CO. D. D. Doblar, T. V. Santiago, and N. H. Edelman (Rutgers Medical School, Piscataway, N.J.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 43, Sept. 1977, p. 455-462. 25 refs. Grant No. NIH-HL-16022.

A77-49263 Influence of temperature on hemoglobin-ligand interaction in whole blood. M. P. Hlastala (Washington, University, Seattle, Wash.), R. D. Woodson (Wisconsin, University, Madison, Wis.), and B. Wranne (Linkoping, Universitetet, Linkoping, Sweden). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 43, Sept. 1977, p. 545-550. 31 refs. Grants No. NIH-HL-00182; No. NIH-HL-12174; No. NIH-HL-13517; No. NIH-HL-17808; No. NIH-71-2105-B.

A77-49272 Cerebellar dynamics - The mossy fiber input. M. Hassul and P. D. Daniels (Washington, University, Seattle, Wash.). *IEEE Transactions on Biomedical Engineering*, vol. BME-24, Sept. 1977, p. 449-456. 28 refs.

A model for the cerebellar cortex is developed which qualitatively describes its temporal behavior. This neural network is treated as a lumped linear system with pure time delays between elements. The model predicts that the cerebellar cortex may act in part as a higher order lead-lag compensator. Physiological experiments performed in the vestibulo-cerebellum of the turtle appear to validate some of the conclusions of the model. (Author)

A77-49273 A computer controlled method for determining the fields of visual system neurons. J. Lubowsky (New York, State University, Downstate Medical Center, Brooklyn, N.Y.). *IEEE Transactions on Biomedical Engineering*, vol. BME-24, Sept. 1977, p. 461-466. 16 refs. Grant No. NIH-RR-00291.

Determining the shape of the response field of a visual system neuron by monitoring its responses to a manually manipulated light stimulus is a very tedious procedure. Equipment and computer programs are described which allow a computer to control the shape of a stimulus image while monitoring the response of a unit (neuron). The technique was used on simulated neurons and neurons of the lateral geniculate bodies of experimental animals (cats). Preliminary results showed that the technique is capable of consistently locating and sizing the response fields of these units. (Author)

A77-49274 An acoustic transducer for application in kinetocardiography. J. G. Davis (Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.). *IEEE Transactions on Biomedical Engineering*, vol. BME-24, Sept. 1977, p. 484-486. 5 refs.

A new noncontact technique for transduction of the kinetocardiogram has been investigated. The technique offers the prime

advantage of complete isolation from the chest wall. Possible distortion due to source loading is eliminated. Other very desirable features are ease of utilization and the ability to produce consistent qualitative results. The technique is based on air-coupled ultrasonic transducers, operating slightly above audible frequencies. (Author)

A77-49275 A model study of stroke values calculated from impedance and their relation to the waveform of blood flow. H. Ito (Kyorin University, Mitaka, Tokyo, Japan), K.-I. Yamakoshi, and T. Togawa (Tokyo Medical and Dental University, Tokyo, Japan). *IEEE Transactions on Biomedical Engineering*, vol. BME-24, Sept. 1977, p. 489-491. 11 refs.

A77-49308 Evaluation of single-pigment shift model of anomalous trichromacy. J. Pokorny and V. C. Smith (Chicago, University, Chicago, Ill.). *Optical Society of America, Journal*, vol. 67, Sept. 1977, p. 1196-1209. 65 refs. Grants No. NIH-EY-00901; No. NIH-EY-70652; No. NIH-EY-00523.

The spectral sensitivity of the visual photopigments, the interobserver variability in color judgments, and the spectral locus of unique yellow provide three major problems for accounts of X-chromosomal-linked anomalous trichromacy. According to the single-pigment hypothesis, the primary defect in anomalous trichromacy is a wavelength shift in the peak sensitivity of one of the three visual photopigments. This shift results in reduction of the anomalous trichromat's r-g opponent chromatic channel. The distribution of response variability in Rayleigh equation match widths due to factors other than the spectral characteristics of the photopigments is similar in normal and anomalous trichromats. When normal and anomalous trichromats make hue estimations of sets of stimuli designed to contain similar chromatic information, their judgments show similar variability. Calculation of the r-g opponent chromatic channel can provide correct predictions of the spectral loci for unique yellow for anomalous trichromats. (Author)

A77-49335 # Mechanized experiment planning in automaton-environment systems. I. Kramosil (Ceskoslovenska Akademie Ved, Ustav Teorie Informace a Automatizace, Prague, Czechoslovakia). *Kybernetika*, vol. 13, no. 4, 1977, p. 225-244. 12 refs.

The importance of design of experiments in cognitive automaton-environment systems is examined and in-process design of the experiment is investigated. Formulas sampled at random during statistical testing of target formulas, formula-evaluating procedures, and in-process design of an experiment to verify target formulas under conditions where the formula's validity is estimated statistically are considered. Reduction in the cost of the experiment concomitant with the quality of the testing procedure implemented for statistical deduction of suitable formulas is demonstrated. The procedure is applicable to design of an automaton for exploring unknown environments (surface of planets or moon, ocean bottoms). R.D.V.

A77-49370 # Effect of postsynaptic factors on presynaptic nerve endings /functional feedbacks in the synapse/ (O vliianii postsinapticheskikh faktorov na presinapticheskie nervnye okonchaniia /funktsional'nye obratnye sviazi v sinapse/). D. P. Matiushkin (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 8, July-Sept. 1977, p. 28-47. 123 refs. In Russian.

A77-49371 # Mechanisms of neurogenic vasodilation (Mekhanizmy neirogennoi vazodiliatatsii). S. I. Teplov (Ministerstvo Zdravookhraneniia SSSR, Leningradskii Neirokhirurgicheskii Institut, Leningrad, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 8, July-Sept. 1977, p. 74-96. 209 refs. In Russian.

A survey of results, obtained chiefly in the past ten years, on the efferent structure and central representation of neurogenic vasodilative reactions is presented. On the basis of experiments with pharmacological blocks of vasodilations evoked by stimulating the brain centers, nerve fibers, and vascular receptors, the distinction between passive vasodilation and its active forms - adrenergic, cholinergic, and sympaticoenergic - is made. The interaction of these types of vasodilation is considered, and the possible functional value of each one is discussed. P.T.H.

A77-49372 # Characteristics of fatty acid metabolism in mammals during fasting (Osobennosti obmena zhirov u mlekopitaiushchikh pri golodanii). E. D. Vasil'eva (Akademiia Nauk SSSR, Institut Tsitologii i Genetiki, Novosibirsk, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 8, July-Sept. 1977, p. 97-127. 216 refs. In Russian.

The paper is a review of main results in the literature dealing with the characteristics of mobilization and utilization of fats in fasting mammals. The general features of the interrelationships between the processes of oxidation and esterification of fatty acids mobilized from fatty tissue, and also mechanisms explaining the dependence of gluconeogenesis and ketogenesis on fat oxidation are examined. It is conjectured that the role of fats in gluconeogenesis is not limited to the catalytic effect of their oxidation products on the enzyme systems. It is possible that unsaturated high-molecular fatty acids take part in the substratum supplying of glucose synthesis by a methylmalonate path. P.T.H.

A77-49437 # Ecological aspects of respiratory physiology and hereditary variations in reactivity (Ekologichni pitannia fiziologii dikhannia ta spadkovi variatsii reaktivnosti). V. Ia. Berezovs'kii (Akademiia Nauk Ukrains'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 23, July-Aug. 1977, p. 435-445. 47 refs. In Ukrainian.

The physiological basics of respiratory metabolism and the evolution of respiratory paths in living organisms is reviewed and effects of industrial pollution on the viability of life forms and differential responses of affected life forms are surveyed. Human respiratory disorders (emphysema, bronchial asthma, chronic lung deterioration due to unspecified causes) and pollution effects on related functions (hemodynamics, tissue respiration, circulatory system) in various species, hereditary interspecies and intraspecies variability in responses to hypoxia and excess CO_2, effects on neurohumoral regulation of respiration, and the need to study individual and species variations in response are emphasized. R.D.V.

A77-49438 # Local features in the lung of healthy subjects and in pulmonary pathology (Regionarni osoblivosti legen' u zdorovikh liudei ta pri legenevii patologii). L. I. Zhukovs'kii and Iu. O. Frinerman (Kiivs'kii Institut Tuberkul'ozu ta Grudnoi Khirurgii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 23, July-Aug. 1977, p. 446-450. 13 refs. In Ukrainian.

Zonal rheographic patterns are studied as a tool in distinguishing various modes of lung pathology, and are compared to clinical ECG data and spirographic data. Over 900 patients of lung disorders were included in the study, with 80 healthy subjects as controls. Rheographic curve forms typifying hyperventilation, hypoventilation, absence of ventilation, emphysema, and some 'paradoxal' patterns are compared. Pulmonary vessel pulsation curves are classified: extrapulmonary, pneumosclerotic, fibrous, emphysematous. Curves typifying hypertensive and hypotonic vascular tonus conditions, and lung cancer, are also distinguished. R.D.V.

A77-49439 # Lung capacities of healthy subjects of different ages (Legenevi ob'emi u zdorovikh liudei riznogo viku). A. M. Marin (Donets'kii Institut Gigieni Pratsi ta Profzakhvoriuvan', Donetsk, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 23, July-Aug. 1977, p. 451-455. 19 refs. In Ukrainian.

A study was made of literature data on absolute and relative indexes of physiological lung capacities (vital capacity, residual volume, total lung capacity). Data referable to 60 male subjects in age brackets to 30, 40, and 55 were investigated. Dynamic changes of those indexes with age of the subjects were examined. An alignment chart is developed for determination of normal values of pertinent ratios (total volume to vital capacity or total volume to residual capacity). R.D.V.

A77-49440 # **Age differences in human external respiration response to hyperoxic and hypoxic gas mixtures (Vikovi osoblivosti reaktsii zovnishn'ogo dikhannia liudini na giperoksichni ta gipoksichni gazovi sumishi).** T. V. Serebrovs'ka (Akademiia Nauk Ukrains'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal,* vol. 23, July-Aug. 1977, p. 456-461. 30 refs. In Ukrainian.

A study is made of lung ventilation (LV) and alveolar ventilation (AV) under normal conditions and during inspiration of gas mixtures of 40% or 14.5% O2 in nitrogen. Adults, and juveniles of various age levels (4-5, 8-9, 14-15) were involved in the study. A decrease in LV is observed in all the groups as the primary hyperoxic reaction. The AV/LV ratio increases more markedly in children. Physiological respiratory dead space decreases in children and increases in adults. Gas exchange is unaffected except during the first minutes of the hyperoxic period. Inspiration of hypoxic mixture brings about a primary LV increase, followed by increased LV, AV/LV, and O2 intake, and slight reduction in gas exchange in children. R.D.V.

A77-49441 # **Respiration efficiency of athletes engaged in muscular activity of different intensity (Efektivnist' zovnishn'ogo dikhannia u sportsmeniv pri m'iazovii diial'nosti riznoi potuzhnosti).** V. A. Antikova (Kiivs'kii Institut Fizichnoi Kul'turi, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal,* vol. 23, July-Aug. 1977, p. 469-480. 36 refs. In Ukrainian.

Tests were performed on 66 athletes (cyclists, skiers, swimmers) to assess respiration efficiency during exertion. Different levels and durations of exertion were tested using a veloergometer. Highest efficiency was noted in exercises lasting 15 to 30 min for oxygen supply and 5 min for CO2 exhalation. Exertions to the limit lasting over 15-30 min bring about maximum external respiration efficiency in terms of oxygen supply and increased respiratory volume in cyclic exercises. Strenuous exercises lasting 5-10 min are most effective in terms of CO2 removal economy. Strenuous work lasting 60 min is recommended for endurance training of athletes. R.D.V.

A77-49442 # **Changes in energy consumption rate and respiratory functions of athletes subjected to thermal stress (Zmina energovitrat i funktsii dikhannia u sportsmeniv v umovakh teplovogo stresu).** A. S. Pavlov and V. O. Romanenko (Donets'kii Medichnii Institut, Donetsk, Ukrainian SSR). *Fiziologichnii Zhurnal,* vol. 23, July-Aug. 1977, p. 481-485. 19 refs. In Ukrainian.

Studies of gas metabolism, energy consumption, and external respiration were conducted on 76 athletes (pole jumpers, weight lifters, sprinters, gymnasts, boxers) and 42 nonathletes. Hyperthermia in response to thermal stress occurs more readily in nonathletes, following 30 min thermal and physical loading, along with increased oxygen uptake, CO2 secretion, and heat accumulation. Identical hyperthermia conditions result in athletes' higher oxygen utilization (18-55%) and greater heat accumulation (13-35%), but a much longer time (39-60%) required to reach the same hyperthermic level as in the nonathletes. R.D.V.

A77-49443 # **Tissue respiration features in white rats exhibiting high and low resistance to hypoxia (Osoblivosti tkaninnogo dikhannia u visoko- ta niz'kostiikikh do gipoksii bilikh shchuriv).** A. I. Nazarenko and T. V. Melikhova (Akademiia Nauk Ukrains'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal,* vol. 23, July-Aug. 1977, p. 499-503. 11 refs. In Ukrainian.

Oxygen uptake by white rat tissues taken from the cerebral hemispheres, liver, and femoral muscle (male specimens) was determined manometrically in an air atmosphere and in a hypoxic gas mixture (2.1% oxygen). Comparisons were made with tissue respiration in intact animals and animals acclimatized on Mt. Elbrus. Cerebral and liver tissues of the high-resistance strain show lower oxygen uptake in the air atmosphere but slightly higher oxygen uptake in the hypoxic mixture. R.D.V.

A77-49444 # **Morphological and histochemical indices of compensatory adaptations in organs in response to oxygen insufficiency (Morfologichni i gistokhimichni oznaki kompensatornikh pristosuvan' v organakh pri nestachi kisniu).** V. S. Bilokrinits'kii (Kiivs'kii Institut Zagal'noi i Komunal'noi Gigieni, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal,* vol. 23, July-Aug. 1977, p. 504-515. 32 refs. In Ukrainian.

The nature and degree of morphological and histochemical changes brought about in various white rat organs (kidney, liver, heart, brain) by altitude chamber (8000 m equivalent altitude) tests inducing chronic and acute hypoxia are studied. These changes are traced in all instances to reconfiguration of rat metabolism (redistribution of enzyme activity in the Krebs cycle, enzymes of the pentose-phosphate shunt, enhanced glycogen utilization and subsequent inhibition of lipid utilization with slight changes in nucleic acid content) such that cells and tissues cope effectively with the damage incurred. R.D.V.

A77-49445 # **The functional state of the cardiovascular system with sinocarotid reflex (Funktsional'nii stan sertsevo-sudinnoi sistemi pri sinokarotidnomu refleksi).** Iu. Iu. Maliarenko, I. I. Mirushchenko, E. V. Kurbatova, S. A. Ter-Antoniants, and Z. I. Izgachova (Tambovs'kii Pedagogichnii Institut, Tambov, Ukrainian SSR). *Fiziologichnii Zhurnal,* vol. 23, July-Aug. 1977, p. 524-527. 12 refs. In Ukrainian.

Data derived from simultaneous traces of the Korotkov sounds, ECG, and pressure in the sphygmanometer cuff are utilized in plotting a curve of Korotkov sounds (QK) vs pressure. The ordinate is plotted in mm Hg and the curve coincides with the knee in the rise of the 1st-order arterial wave. A functional test involving a short ligation of the common carotid artery is usually accompanied by increased maximal and minimal pressures, and shortening of the QK wave segment. The contractile ability of the myocardium and the rate of pulse wave propagation both increase. R.D.V.

A77-49446 # **Some problems in cardiac electrokymography (Deiaki pitannia elektrokimografii sertsia).** M. S. Kamenets'kii, G. N. Lun'ov, and V. V. Gubenko (Donets'kii Medichnii Institut, Donetsk, Ukrainian SSR). *Fiziologichnii Zhurnal,* vol. 23, July-Aug. 1977, p. 528-532. 17 refs. In Ukrainian.

Results on cardiac activity obtained via electrokymography of 54 healthy subjects are presented and discussed. Information on the contractile ability of the myocardium and on intracardial hemodynamics was obtained; differences between electrokymographic patterns of the two ventricles are noted. Densigrams and electrokymograms of pulmonary artery function are compared. Phases of cardiac activity are calculated, and effects of intravenous injection of euphillin on cardiac activity are noted. R.D.V.

A77-49468 # **Functional relation between the spectrum of atmospheric electrical discharges and biological activity of living organisms (Funktsional'naia sviaz' spektra atmosfernykh elektricheskikh razriadov s biologicheskoi aktivnost'iu zhivykh organizmov).** T. G. Zhgenti and G. Sh. Kevanishvili (Tbilisskii Gosudarstvennyi Universitet, Tiflis, Georgian SSR). *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia,* vol. 86, June 1977, p. 617-620. 10 refs. In Russian.

The physical behavior of cells and membraned microorganisms is analyzed mathematically for the case where these objects are subjected to a low-frequency electromagnetic field. It is shown that when the electromagnetic-field frequency approaches one of the eigenfrequencies of a membrane, the intensity of the mechanical vibrations induced in the membrane increases without limit, resulting in a resonance effect. It is noted, however, that in reality the amplitude of membrane vibrations would not become infinitely large due to dissipative forces. It is concluded that atmospheric electrical discharges and various other sources, such as the low-frequency portion of the solar spectrum, constitute direct suppliers of mechanical energy for the organic world on earth. F.G.M.

A77-49472 # Age-related changes in the mucopolysaccharide content in human coronary-artery walls (Vozrastnye izmeneniia soderzhaniia mukopolisakharidnogo sostava v stenkakh venechnykh arterii cheloveka). N. B. Lomidze (Akademiia Nauk Gruzinskoi SSR, Institut Eksperimental'noi Morfologii, Tiflis, Georgian SSR). *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia*, vol. 86, June 1977, p. 713-716. 5 refs. In Russian.

A77-49503 Model for some nonthermal effects of radio and microwave fields on biological membranes. F. S. Barnes and C.-L. J. Hu (Colorado, University, Boulder, Colo.). *IEEE Transactions on Microwave Theory and Techniques*, vol. MTT-25, Sept. 1977, p. 742-746. 18 refs. USAF-supported research.

Two possible mechanisms are investigated by which microwave and RF fields may produce nonthermal effects in biological materials. The influence of RF fields on the equilibrium concentration of charged particles on opposite sides of a membrane is examined, and the effect of the nonlinear Boltzmann equation on both the concentration shift and the ion current that flows as a result of the membrane's rectifying properties is estimated. The size of the torque that may be exerted on long-chain molecules containing dipole or induced dipole moments is then evaluated. The results show that the currents which can arise due to ac electric fields are large enough that a sufficient number of charged ions or molecules could be moved across a membrane to cause biological changes in periods of time of the order of currently studied exposures. It is also found that long-chain molecules can be oriented in moderate electric fields. F.G.M.

A77-49504 Internal EM field and absorbed power density in human torsos induced by 1-500-MHz EM waves. K.-M. Chen and B. S. Guru (Michigan State University, East Lansing, Mich.). *IEEE Transactions on Microwave Theory and Techniques*, vol. MTT-25, Sept. 1977, p. 746-756. 12 refs. NSF Grant No. ENG-74-12603; Grant No. DAAG29-76-G-0201.

Numerical results on the internal electromagnetic (EM) field and absorbed power density inside a human torso induced by EM waves of frequencies ranging from 1 to 500 MHz and of both vertical and horizontal polarizations are presented. The induced fields inside the torso are shown to be dependent on the frequency and the torso geometry. Theoretical results are obtained based on the tensor integral equation method, and some theoretical predictions are compared with existing experimental results. (Author)

A77-49673 # The human operator in the search situation (Liudina v situatsii poshuku). O. M. Svenson, V. V. Rudenko, N. T. Tinna, B. O. Popov, and T. M. Lunik. *Akademiia Nauk Ukrains'koi RSR, Visnik*, vol. 41, July 1977, p. 34-43. 17 refs. In Ukrainian.

Physiological and perception aspects of the pattern recognition problem are examined. Attention is given to: fatigue effects in parallel search and sequential search exercises, reflex responses to simple picture elements and to more complex patterns, and probabilistic tools for analysis of pattern recognition problems. Sequential searches are found more fatiguing than parallel searches of like duration, while search and disclosure of a simple pattern exhibiting reflex features absent in the background elements are handled directly by the eye analyzer. Conditions favoring efficient performance by the human operator in pattern recognition are specified. A procedure for calculating 'generalized contrast' is outlined. R.D.V.

A77-49826 Disorienting effects of aircraft catapult launchings. III - Cockpit displays and piloting performance. M. M. Cohen (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 797-804. 12 refs. Navy Project ZR-04101; NAVAIR Project F51-523.

Accelerations closely approximating those encountered in catapult launchings of carrier-based aircraft were generated on the Naval Air Development Center's human centrifuge Dynamic Flight Simulator. Flight instruments, controls, and flight dynamics of an A-7 aircraft were provided to four experienced Naval aviators, who exercised closed-loop control of a simulated climbout immediately after they were exposed to the accelerations. Four experimental conditions were employed for each aviator: (1) no operational flight instruments, (2) conventional flight instruments, (3) a single carrier takeoff director display, and (4) conventional flight instruments and the takeoff director display operating concurrently. Measures of flight parameters, including indicated airspeed, angle of attack, rate of climb, altitude, pitch attitude, and pitch trim adjustments were monitored throughout the simulation. Subjective reactions and piloting performance were examined under each of the four conditions. Results indicate that the carrier takeoff director display significantly reduced pilot workload and enhanced performance during the climbout. (Author)

A77-49827 Marginal alveolar bone loss in flying personnel - A radiographical followup study. O. G. Carlson and K. Zackrisson (Swedish Air Force Institute of Aviation Medicine, Linkoping, Sweden). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 805-807. 7 refs.

In a ten-year followup study, the alveolar marginal bone of the mandible in flying personnel has been examined on radiographs. The radiographs were obtained at five-year intervals. The reduced height of the marginal alveolar bone was measured according to an internationally accepted standard procedure and compared with figures obtained from radiographs made ten years earlier. Compared with similar material concerning subjects not occupationally involved in flying, this study shows that flying personnel suffer considerable alveolar, marginal bone loss. High-altitude flying, reduced partial oxygen pressure, stress, and vibrations are being discussed as suspected causes. An interesting and disturbing point is that the alveolar process usually is the first bone that reveals a generally decreased bone calcification. Further studies of the skeletal bone and the serum concentration of calcium are in progress. Subjects for these studies are flying personnel (jet, propeller, and helicopter) from the Swedish Air Force. (Author)

A77-49828 Quantitative histochemistry of the vestibular cerebellum of the fish Fundulus heteroclitus flown aboard the biosatellite Cosmos-782. I. B. Krasnov (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 808-811. 24 refs.

The fry of Fundulus heteroclitus, hatched from eggs flown for 19.5 d aboard the biosatellite Cosmos-782, showed on Day R+5 a slightly increased activity of creatine kinase at the sites of projection of primary vestibular fibers in the cortex of the vestibular cerebellum. The change was determined by quantitative histochemical analysis. The increase indicates an elevation of the functional activity of the structures of the vestibular cerebellum which developed in zero G and which normally receive primary impulses from gravireceptors. (Author)

A77-49829 * Ultrastructural changes in tracheal epithelial cells exposed to oxygen. D. E. Philpott, G. A. Harrison, C. Turnbill, and S. Black (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 812-818. 14 refs.

White albino rats were sacrificed after 24, 36, 48, 72, and 96 h of exposure to 100% O2 at 1 atm. Tissue was prepared for the scanning electron microscope (SEM) by Critical Point Drying and for the transmission electron microscope (TEM) by plastic embedding. Scanning microscopy showed a loss of microvilli after 48 h of exposure. Cilia appeared relatively normal with SEM, but TEM revealed changes in the outer membrane. In TEM, nonciliated cells appeared swollen and often encroached on the ciliated cells. A heavy mucous blanket remained even after processing. All the changes observed that are induced by oxygen exposure contribute to mucostasis, reducing and/or halting mucociliary clearance. (Author)

A77-49830 **Effect of virtual image projection distance on the accommodative response of the eye.** G. T. Chisum and P. E. Morway (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 819-823.

An investigation was conducted concerning the effect of one of the display characteristics, image projection distance, on the accommodation of the user. Beam splitters simulating both the aircraft-mounted and the crew personnel-mounted virtual image displays were utilized in conjunction with projectors in which the focus of the projected image could be varied. The first and fourth Purkinje images were employed to monitor the accommodation of the observers. The information obtained in the investigation can be utilized to determine the tolerance limits for the precision required in the virtual image display design. The considered aspects are particularly significant for the design of helmet-mounted sights and displays. G.R.

A77-49831 **Some aspects of energy metabolism in human blood erythrocytes under hypokinesia and during space flights.** A. S. Ushakov, S. M. Ivanova, and S. S. Brantova (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 824-827. 24 refs.

A77-49832 * **Femoral development in chronically centrifuged rats.** S. D. Smith (Kentucky, University, Lexington, Ky.). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 828-835. 7 refs. Grant No. NsG-2187.

Groups of 30-d-old male and female rats were centrifuged at 2.00 G (RE, Rotation Experimental), 1.05 G (RC, Rotation Control) or exposed to the noise and wind of the centrifuge at 1.00 G (EC, Earth Control) for periods of 1, 2, 4, 8, and 16 weeks. Measurements of their femurs indicated that exposure to centrifugation a) decreased femoral length in RE animals, b) increased femoral length in RC animals, c) reduced femoral diameter in RE and RC animals, d) increased L/D ratios in RC animals, e) decreased L/D ratios in RE animals, f) increased femur length/body weight in RE animals, g) decreased cortical thickness (CT) in RE animals, h) increased relative CT in RE animals, and decreased it in RC animals, i) accelerated ossification in RC femoral heads, j) thinned and distorted RE epiphyseal plates, and k) thickened condylar cartilage in RE females. The effects tended to be strongly sexually dimorphic, with females more severely affected by the stress than males. (Author)

A77-49833 **Exercise and heat orthostatism and the effect of heat acclimation and physical fitness.** E. Shvartz, A. Meroz, A. Magazanik, Y. Shoenfeld, and Y. Shapiro (Tel Aviv University, Sheba Medical Center, Tel Aviv, Israel). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 836-842. 24 refs. Research supported by the United States-Israel Binational Science Foundation.

Twelve trained and 16 untrained young men were administered five orthostatic tests while leaning upright against a wall, for 20 min - before exercise; after 60 min of exercise at a load of 40 W; after 15 min of exercise at a load of 80 W; after an oxygen uptake max test, and after 3 h of exercise at a load of 40 W in heat (39.4 C DB, 30.3 C WB). Eight of the untrained subjects were retested in the five orthostatic tests after 8 d of heat acclimation. The number of fainters in the orthostatic tests administered before exercise, after exercise at 40 W and 80 W, and after exercise in heat, were 3, 4, 6, and 13, respectively. There were no fainting episodes after the oxygen uptake max tests. Orthostatic responses in the different conditions were partially related. The trained subjects showed substantially better responses than the untrained ones (10% vs. 25% of fainting episodes), and heat acclimation resulted in marked improvement in orthostatism (decrease to 5% faintings). The results show that oxygen uptake max and heat tolerance account for most of the variability which determines orthostatic tolerance. (Author)

A77-49834 * **Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-O2 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/.** C. J. Lambertsen, R. Gelfand, R. Peterson, R. Strauss, W. B. Wright, J. G. Dickson, Jr., C. Puglia, and R. W. Hamilton, Jr. (Penssylvania, University, Medical Center, Philadelphia, Pa.). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 843-855. 32 refs. Contracts No. N00014-67-A-0216-0026; No. N00014-67-A-0216-0024; Grants No. NIH-HL-08899-08; No. NGL-39-010-097.

A77-49835 **Effect of emotional stress on recognition of visual patterns.** P. V. Simonov, M. V. Frolov, V. F. Evtushenko, and E. P. Sviridov (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 856-858. 7 refs.

The object of the study was to observe the changes in efficiency of perceptive activity of man (recognition of visual patterns against a background of noises) throughout an increase in emotional stress caused by a forthcoming parachute jump. A moderate degree of emotional stress can improve performance efficiency and decrease the number of the subject's errors. Later an impairment of differentation of similar signals was seen and an increase in the number of 'false alarm' errors along with a decrease in the number of omissions to reactions signals. The neurophysiological basis of such changes in perceptive activity consists in a transition from conditional behavior to reaction through mechanisms of Ukhtomsky's dominant focus. (Author)

A77-49836 **Antisomatogyral illusion.** M. J. Correia (Texas, University, Galveston, Tex.), J. B. Nelson (Louisiana State University, Baton Rouge, La.), and F. E. Guedry, Jr. (U.S. Naval Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, Fla.). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 859-862. 23 refs. Contract No. N00014-76-C-0622. NR Project 201-185.

Following voluntary ambulatory turning (eight turns), perceived motion is reversed in direction relative to (1) aftereffects of passive rotation and (2) predictions from current concepts of inner ear function. Following active turning, feedback from reflexes elicited by vestibulospinal activity apparently dominates the perceptual experience. Practical consequences in medicine and aviation are discussed. (Author)

A77-49837 * **Evaluation of a new antinauseant drug for the prevention of motion sickness.** A. Graybiel and J. Knepton (U.S. Naval Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, Fla.). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 867-871. 7 refs. NASA Order T-5904-B; Navy Task MF51,524,005-7015.

The new drug, AHR 5645B, together with other drugs was evaluated in tests, conducted with eight male subjects, concerning its ability to prevent motion sickness. It was found that AHR 5645B, used in doses of 20, 50, and 100 mg, was not efficacious in preventing experimental motion sickness. A combination of 50 mg meclizine and 25 mg ephedrine sulfate produced the best results. Favorable results were also obtained with a combination of 12.5 mg promethazine hydrochloride and 12.5 mg ephedrine sulfate. The findings in the reported experiment point to the difficulty of identifying a highly efficacious antimotion sickness drug for everyone. G.R.

A77-49838 **Continuous ECG monitoring on civil air crews during flight operations.** C. Sekiguchi, T. Kitajima, Y. Ueda (Jikei University School of Medicine, Tokyo, Japan), and O. Yamaguchi (Japan Air Lines Co., Ltd., Tokyo, Japan). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 872-876. 20 refs. Research supported by the Japan Civil Aviation Promotion Foundation.

Although the results of suitable medical examinations of pilots on the ground have much validity, they do not exclude completely the possible occurrence of a cardiac abnormality during flight operations. It is, therefore, very useful to know the effect of the direct load due to flight operations and the exposure to severe mental stress. Studies of ECG changes during the flight can be studied with the aid of a system developed by Holter (1961). A description is presented of studies in which Holter's system was used to examine ECG signals of aircrew members during takeoff, cruising at high altitude, approach, and landing. The significance of the recordings is discussed. G.R.

A77-49839 Prevention of visual anxiety and proficiency problems in the senior air transport pilot. S. Diamond and M. F. Leeds (Pan American World Airways, Inc., San Francisco, Calif.). *(Airline Medical Directors Association, Annual Scientific Meeting, 32nd, Las Vegas, Nev., May 7, 1977.) Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 877-881. 9 refs.

The special vision-related needs of pilots between age 50 and 60 are considered, taking into account the characteristics of glasses which will provide the pilot with the required range of near vision. It is pointed out that the panel distance is the critical factor. The outermost portion or longest portion of the near range should be at least 80-83 cm. The lenses should be ground exactly to prescription; plus or minus 0.25 D is very important. Special vision problems affecting pilots and approaches used for correcting these problems are illustrated with the aid of five case reports. G.R.

A77-49840 Emergency medical kits aboard aircraft. J. Pasquet (Compagnie Nationale Air France, Paris, France). *Aviation, Space, and Environmental Medicine*, vol. 48, Sept. 1977, p. 882-885.

It has been found that in the event of a medical emergency during the flight of an airliner in three cases out of four a physician present among the passengers was available to attend to the patient. The proposal has been made to improve the physician's effectiveness by providing him with a real doctor's emergency kit which would be kept aboard on all long-distance flights for such occasions. A physician passenger who has the proper equipment at his disposal can sometimes manage to avoid serious medical complications and, in any case, can soothe a patient and perhaps permit the aircraft to proceed to the next scheduled stop without diversion. A number of airlines, including Air France, Alitalia, Iberia, Lufthansa, and Sabena, have decided to equip their airliners with such a kit. Attention is given to the doctor's emergency kit, the first aid kit, and the cabin attendants' medical kit used by Air France. Questions regarding the definition of the legal minimum for the different types of emergency medical kits are also discussed. G.R.

A77-49923 Influence of water temperature on thermal, circulatory and respiratory responses to muscular work. F. Pirnay, R. Deroanne, and J. M. Petit (Liège, Université, Liège, Belgium). *European Journal of Applied Physiology*, vol. 37, no. 2, 1977, p. 129-136. 27 refs.

A77-49924 The relationship between physiological parameters and performance in a compensatory tracking test to determine aptitude (Verhalten physiologischer und Leistungsparameter beim Kompensationstracking unter Eignungsaspekten). G. Schreinicke, K. Scheuch, and B. Hüber (Leipzig, Universität, Leipzig, East Germany). *European Journal of Applied Physiology*, vol. 37, no. 2, 1977, p. 137-151. 32 refs. In German.

The physiological responses of twenty-five subjects performing a test of their ability to correct stochastic amplitude variations were monitored. The parameters studied included measurements of excitation such as heart rate, arrhythmia and respiratory rate; personality characteristics were also taken into account in studying the performance of the subjects. It was found that the physiological parameters could be correlated to the level of achievement of the subjects. This correlation suggests that a technique for assessing individual differences of aptitude for certain tasks may be developed based on psychological and physiological indicators. J.M.B.

A77-49927 The objective evaluation of aircrew protective breathing equipment. I - Oxygen mask/goggles combinations. II - Fullface masks and hoods. D. deSteiguer, M. S. Pinski, E. B. McFadden (FAA, Protection and Survival Laboratory, Oklahoma City, Okla.), and J. R. Bannister (FAA, Aeronautical Center, Oklahoma City, Okla.). In: Survival and Flight Equipment Association, Annual Symposium, 14th, San Diego, Calif., September 13-16, 1976, Proceedings. Canoga Park, Calif., Survival and Flight Equipment Association, 1976, p. 4-12. 6 refs.

Tests conducted for ease of donning and protection against in-leakage of contaminants are reported for 118 combinations of breathing masks and eye goggles and for 17 fullface masks and 2 hoods. Problems encountered in the use of the protective devices under practical conditions, relevant anthropometric measurements (head/face length/breadth), and means of securing the protective devices are discussed. Ease of donning and wearing in combination or over eyeglasses, difficult fit problems (e.g., around the nasal bridge, temples), and positive pressure requirements are dealt with. None of the mask/goggle combinations not designed for accepting positive pressure met the acceptance criteria. R.D.V.

A77-49928 Efficiency of the oxygen mask delivery system at the USAF hyperbaric center. P. J. Sheffield, T. R. Morgan, and R. L. Stork (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). In: Survival and Flight Equipment Association, Annual Symposium, 14th, San Diego, Calif., September 13-16, 1976, Proceedings. Canoga Park, Calif., Survival and Flight Equipment Association, 1976, p. 13, 14.

Results of intermittent hyperbaric oxygenation are examined to assess the required 100% delivery of oxygen to patients' respiratory tracts. Four mask sizes can be fitted to patients by using a silicon material manufactured for denture impressions. The efficiency of the projected aviator oxygen mask delivery system was evaluated breath-by-breath via two different measuring techniques, relying on computerized oxygen and carbon dioxide analyzer tests and on mass spectrometric readings. R.D.V.

A77-49929 The use of n-pentane as a tracer gas for the quantitative evaluation of aircrew protective breathing equipment. D. deSteiguer, E. B. McFadden, M. S. Pinski (FAA, Protection and Survival Laboratory, Oklahoma City, Okla.), and J. R. Bannister (FAA, Aeronautical Center, Oklahoma City, Okla.). In: Survival and Flight Equipment Association, Annual Symposium, 14th, San Diego, Calif., September 13-16, 1976, Proceedings. (A77-49926 24-03) Canoga Park, Calif., Survival and Flight Equipment Association, 1976, p. 15-19. 11 refs.

A77-49937 Operational requirements for aircrew anti-exposure suits in the U.S. Navy. A. F. Campbell and S. J. Golle (U.S. Navy, Point Mugu, Calif.). In: Survival and Flight Equipment Association, Annual Symposium, 14th, San Diego, Calif., September 13-16, 1976, Proceedings. Canoga Park, Calif., Survival and Flight Equipment Association, 1976, p. 73-76. 11 refs.

Relatively small deviations from 37.5 C (five deg plus/minus) will cause profound alterations in body physiology. When immersed in cold water, the body transfers heat to the surrounding medium at a rate which depends on the exposed surface area, the thickness and type of protective clothing worn, the temperature gradient between the skin and the water, and the exposure time. Aircrews who eject over water must be provided antiexposure protection to minimize loss of body heat and thus maintain adequate physiological functions while search and rescue operations are effected. Two antiexposure suits, the Navy CWU-33/P ventilated wet suit and the USAF CWU-21/P ventile assembly, and the relative merits and disadvantages are discussed in terms of human engineering factors. (Author)

A77-49938 **Double knit aramid flight suits for aircrewmen.** L. I. Weinstock (U.S. Naval Air Systems Command, Washington, D.C.). In: Survival and Flight Equipment Association, Annual Symposium, 14th, San Diego, Calif., September 13-16, 1976, Proceedings. Canoga Park, Calif., Survival and Flight Equipment Association, 1976, p. 81-84.

Fabric materials, fabric manufacture, and styling for new aircrew garments and flight suits are described. Appearance, enhanced comfort and fit, reduction in the number of sizes and variants, and thermal protective capability are areas in which premium is placed upon improvements. Salient properties of suitable fabrics are illustrated by tabulated data (on weight, thickness, air permeability, tear strength, breaking strength, abrasion resistance, thermal shrinkage, flame breakthrough time). Tests (thermal, fire, pit, preliminary flight evaluation) and their results are described. R.D.V.

A77-49939 **The Arctic personnel ambulatory anti-exposure system.** R. L. Bell (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). In: Survival and Flight Equipment Association, Annual Symposium, 14th, San Diego, Calif., September 13-16, 1976, Proceedings. Canoga Park, Calif., Survival and Flight Equipment Association, 1976, p. 85-87.

An anti-exposure coverall suit for airmen aboard aircraft (helicopter, cargo, utility craft) downed over polar land regions (Arctic or Antarctic) and accompanying escape/recovery system are described. Existing equipment and suitable modifications are treated: propane-fueled portable source of heat and electric power, a liquid loop garment, and a down-insulated garment. The survivor can function in ambulatory mode in the suit, with a backup source of electric power for the survival radio should radio batteries fail; sufficient thermal protection in the arctic environment is provided for several hours. Testing of the equipment and subjective responses of a test subject using the equipment under simulated conditions are reported. R.D.V.

A77-49940 **Pulsating seat cushion evaluation.** J. P. Cooke and T. R. Morgan (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). In: Survival and Flight Equipment Association, Annual Symposium, 14th, San Diego, Calif., September 13-16, 1976, Proceedings. Canoga Park, Calif., Survival and Flight Equipment Association, 1976, p. 88-91. 6 refs.

A pulsating-type seat cushion has been shown to be useful in helping to prevent a feeling of 'tiredness' during 3-hr periods of physical inactivity of suited inactive subjects while seated in an ejection-type chair at a pressure equivalent to a cabin altitude of 25,000 ft (7,620 m). Additionally, the cushion offered no hazard during decompression of subjects to 65,000 ft (19,812 m). The feet were not moved during this test, simulating confinement in a small cockpit. Ultrasonic measurement of blood flow velocity during the 3-hr periods revealed a large reduction in flow velocity when the cushion was not pulsating, compared to only a slight reduction when the seat cushion was in the pulsating mode. This finding agreed with subjective responses, which reported the cushion to be valuable in helping prevent fatigue. (Author)

A77-49941 **The VTAS/helmet interface.** G. D. Hedges (Honeywell, Inc., Government and Aeronautical Products Div., St. Louis Park, Minn.) and R. Z. Snyder (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). In: Survival and Flight Equipment Association, Annual Symposium, 14th, San Diego, Calif., September 13-16, 1976, Proceedings. Canoga Park, Calif., Survival and Flight Equipment Association, 1976, p. 92-96.

The Honeywell Visual Target Acquisition Set utilizes a helmet mounted device to provide real-time data on a pilot's helmet position and thus line-of-sight. The practicability of the helmet sight concept has been demonstrated, but it has also been learned that a careful blending of VTAS requirements with those of the helmet as a protective device is necessary to achieve success. This paper provides a basic description of how VTAS works, discusses helmet mounted unit design constraints, describes the experience gained to data with helmet mounted units, and shows how this was applied to develop the NADC VTAS III helmet. This lightweight, compact unit utilizes the latest materials and techniques available to integrate the helmet sight functions into the helmet itself. Future efforts in this area including continued acquisiton of flight test data and environmental testing are also described. (Author)

A77-49942 **Human compatibility testing of the RAF P/Q oxygen mask with the USAF HGU-2A/P flying helmet.** R. L. Stork and J. P. Cooke (USAF School of Aerospace Medicine, Brooks AFB, Tex.). In: Survival and Flight Equipment Association, Annual Symposium, 14th, San Diego, Calif., September 13-16, 1976, Proceedings. Canoga Park, Calif., Survival and Flight Equipment Association, 1976, p. 97-100.

A77-49943 **Development of a helmet-mounted PLZT thermal/flash protection system.** J. O. Harris, Jr., J. T. Cutchen (Sandia Laboratories, Albuquerque, N. Mex.), and B. J. Pfoff (USAF, Aeronautical Systems Div., Wright-Patterson AFB, Ohio). In: Survival and Flight Equipment Association, Annual Symposium, 14th, San Diego, Calif., September 13-16, 1976, Proceedings. Canoga Park, Calif., Survival and Flight Equipment Association, 1976, p. 101-104. 9 refs. ERDA-USAF-Army-supported research.

PLZT thermal/flash protective devices (TFPD's) designed to prevent exposure and resultant eye damage from nuclear weapon detonations are described. The primary emphasis is on technology transfer and production capability for helmet-mounted PLZT/TFPD goggles, with a non-helmet-mounted configuration to follow. The first production units are anticipated in the fall of 1977. The operating principles of the PLZT/TFPD goggle device are briefly out-lined, and the device configuration and operational characteristics are described. (Author)

A77-49944 **Design and development of the Irvin 'Hitefinder' Automatic Parachute Ripcord Release.** E. D. Kenzie (Irvin Industries Canada, Ltd., Fort Erie, Ontario, Canada). In: Survival and Flight Equipment Association, Annual Symposium, 14th, San Diego, Calif., September 13-16, 1976, Proceedings. Canoga Park, Calif., Survival and Flight Equipment Association, 1976, p. 105-109.

The Hitefinder Automatic Parachute Ripcord Release is designed primarily for use by free-fall parachutists. Some of the problems associated with providing for accurate and consistent automatic parachute openings at relatively low heights above a wide range of dropping zone levels are discussed. Results of in-flight trials on an early model are analyzed and lead to investigations into the varying static air pressure about the body of a parachutist in stabilized free fall. Future developments of the basic concept of the Hitefinder to meet further demands for safety are considered. Besides the primary use of the Hitefinder as an automatic parachute ripcord release for free-fall parachutists, other current and future applications are described. (Author)

A77-49952 **USAFSAM evaluation of the Sierra Lightweight Helmet.** H. F. Mulligan (USAF, Aerospace Medical Div., Brooks AFB, Tex.), W. J. Sears (USAF, School of Aerospace Medicine, Brooks AFB, Tex.), and J. W. Brinkley (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). In: Survival and Flight Equipment Association, Annual Symposium, 14th, San Diego, Calif., September 13-16, 1976, Proceedings. Canoga Park, Calif., Survival and Flight Equipment Association, 1976, p. 155-158.

A new lightweight helmet designed to reduce the stress and strain on the neck of aircrew members was evaluated and compared with another helmet. Traits considered include fit, maintainability, retention/pressure breathing, fixed visual fields, altitude testing, thermal tests, acceleration tests, voice communications effectiveness, chemical defense equipment compatibility, cockpit compatibility

assessment, and subjective/observer evaluation. Noise attenuation and wind tunnel tests were also performed. Recommendations for improvements are discussed. M.L.

A77-50196 Assessing the discomfort of dual-axis whole-body vibration. M. J. Griffin and E. M. Whitham (Southampton, University, Southampton, England). *Journal of Sound and Vibration*, vol. 54, Sept. 8, 1977, p. 107-116. 15 refs.

A77-50308 Rotational motion of an astronaut's trunk. Ia. M. Shapiro. *(Kosmicheskie Issledovaniia*, vol. 15, Jan.-Feb. 1977, p. 62-70.) *Cosmic Research*, vol. 15, no. 1, July 1977, p. 51-59. Translation.

In the present paper, the human body is treated as a mechanical system consisting of nine links: the body and four two-link members. The ways in which the attitude of the astronaut's body can be changed by moving the arms and legs under conditions of weightlessness are examined. V.P.

A77-50444 * Cardiorespiratory responses to exercise after bed rest in men and women. V. A. Convertino, E. M. Bernauer (NASA, Ames Research Center, Laboratory of Human Environmental Physiology, Moffett Field; California, University, Davis, Calif.), R. W. Stremel, and J. E. Greenleaf (NASA, Ames Research Center, Laboratory of Human Environmental Physiology, Moffett Field, Calif.). *Acta Astronautica*, vol. 4, July-Aug. 1977, p. 895-905. 20 refs. NASA-supported research.

The purpose of this study was to compare cardiorespiratory responses of men and women to submaximal and maximal workloads before and after bed rest (BR). Fifteen male college students (19-23 yr) and eight female nurses (23-34 yr) underwent 14 d and 17 d, respectively, of bed rest. The maximal work capacity test was performed in the supine position on a bicycle ergometer just before and immediately after bed rest. Compared with pre-BR values, after bed rest the maximal ventilatory volume was essentially unchanged in the men (+1.8%) and women (+2.3%), but maximal heart rate was elevated from 185 to 193 b/min (+4.3%) in the men and from 181 to 187 b/min (3.3%) in the women. Mean corpuscular volume was unchanged in both groups pre- and post-bed rest. It is concluded that the proportional deterioration in maximal VO2 following prolonged bed rest was essentially the same in young men and women. (Author)

A77-50627 * The use of a behavioral response system in the USF/NASA toxicity screening test method. C. J. Hilado, H. J. Cumming (San Francisco, University, San Francisco, Calif.), and S. C. Packham (Physio-Behavioral Consultants, Salt Lake City, Utah). *Journal of Combustion Toxicology*, vol. 4, Aug. 1977, p. 283-292. Grant No. NsG-2039.

Relative toxicity data on the pyrolysis effluents from bisphenol A polycarbonate and wool fabric were obtained, based on visual observations of the behavior of free-moving mice and on an avoidance response behavioral paradigm of restrained rats monitored by an instrumented behavioral system. The initial experiments show an essentially 1:1 correlation between the two systems with regard to first signs of incapacitation, collapse, and death from pyrolysis effluents from polycarbonate. It is hypothesized that similarly good correlations between these two systems might exist for other materials exhibiting predominantly carbon monoxide mechanisms of intoxication. This hypothesis needs to be confirmed, however, by additional experiments. Data with wool fabric exhibited greater variability with both procedures, indicating possibly different mechanisms of intoxication for wool as compared with bisphenol A polycarbonate. (Author)

A77-50630 Biological effect of fire suppression by nitrogen pressurization in enclosed environments. D. P. Dressler, R. S. Robinson (Harvard University, Cambridge and Youville Hospitals, Cambridge, Mass.), R. G. Gann, J. P. Stone, F. W. Williams, and H. W. Carhart (U.S. Navy, Naval Research Laboratory, Washington, D.C.). *Journal of Combustion Toxicology*, vol. 4, Aug. 1977, p. 314-324. 9 refs. Contract No. N00014-76-C-0062.

Nitrogen pressurization has been used to extinguish a jet fuel (JP-4), reducing oxygen percentage, in order to study the behavioral changes caused by smoke toxicity, including mortality, in laboratory test animals. The ten-run experiment took place in a two-man decompression chamber using 211 unanesthetized rats of standard weight in individual cages and running wheels (for the evaluation of time of useful function). Some of the animals were monitored for heart rate, respiratory rate, and cardiac function; others were sacrificed for histological examination of lungs, heart, and liver. One animal died in the chamber, and another 15 days post exposure. Although some of the remaining animals were not able to maintain equilibrium during exposure, they all recovered, and it was concluded that nitrogen pressurization to two atmospheres (with and without fire) was not harmful to animals. S.C.S.

A77-50631 * Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system. C. J. Hilado, H. J. Cumming, A. M. Machado, J. E. Schneider (San Francisco, University, San Francisco, Calif.), C. R. Crane, D. C. Sanders, B. R. Endecott, and J. K. Abbott (FAA, Aviation Toxicology Laboratory, Oklahoma City, Okla.). *Journal of Combustion Toxicology*, vol. 4, Aug. 1977, p. 325-359. 7 refs. Grant No. NsG-2039. FAA Task AM-A-77-TOX-35.

A77-50635 * Effect of ammonia on Swiss albino mice. C. J. Hilado, C. J. Casey, and A. Furst (San Francisco, University, San Francisco, Calif.). *Journal of Combustion Toxicology*, vol. 4, Aug. 1977, p. 385-388. Grant No. NsG-2039.

Times to incapacitation and death and LC /50/ values were determined for Swiss albino male mice exposed to different concentrations of ammonia in a 4.2 liter hemispherical chamber. The LC/50/ for a 30 minute exposure was 21,430 ppm. (Author)

A77-50636 * Variation in animal response to different toxicants. C. J. Hilado and H. J. Cumming (San Francisco, University, San Francisco, Calif.). *Journal of Combustion Toxicology*, vol. 4, Aug. 1977, p. 389-392. Grant No. NsG-2039.

The variation in response of different lots of male Swiss albino mice to pyrolysis effluents from surgical cotton and from bisphenol A polycarbonate, and to pure carbon monoxide, is discussed. The variation appeared to be less with the pyrolysis gases from polycarbonate than with pure carbon monoxide. (Author)

A77-50638 * A review of available LC/50/ data. C. J. Hilado and H. J. Cumming (San Francisco, University, San Francisco, Calif.). *Journal of Combustion Toxicology*, vol. 4, Aug. 1977, p. 415-424. 12 refs. Grant No. NsG-2039.

Several gaseous products of pyrolysis and combustion have been evaluated for LC/50/, defined as the concentration of toxic gas in the atmosphere being inhaled by test animals that will produce death in 50% of the animals within a given time period. The products tested included CO, HCl, HF, HCN, NO2, and SO2. It was found that HCN and NO2 were consistently the most toxic of the gases reviewed, and that mice were more susceptible than rats to HCl and HF, although less susceptible than rats to NO2. Extrapolation of LC/50/ data to humans indicates that metabolic rate may be a valid basis for extrapolation when the toxicity mechanism is interference with oxygen transport and utilization, or pulmonary edema, but not when it is irritation and damage to the upper respiratory tract. S.C.S.

A77-50660 The helmet protects the aviator's head - Or does it. G. L. Johnson and J. J. Treanor (U.S. Army, Aeromedical Research Laboratory, Fort Rucker, Ala.). *Safe Journal*, vol. 7, Fall 1977, p. 20, 21.

This paper demonstrates the need for trained life support equipment specialists to maintain the protective capability of SPH-4 Army Aviator's Helmets. One hundred helmets selected at random from the user population were evaluated for ability to attenuate impact forces, attenuate noise, and afford eye protection to the

Army aviator. Each individual airman is responsible to maintain his own equipment and no trained equipment personnel are available to inspect or maintain the helmets. Protection was seen to be compromised in the majority of helmets in all three functional areas. The applicability of such a survey is suggested in the case of motorcycle helmets and construction helmets. (Author)

A77-50686 # Current problems in space biorhythmology (Aktual'nye problemy kosmicheskoi bioritmologii). S. I. Stepanova. Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii. Volume 23), 1977. 311 p. 340 refs. In Russian.

The book covers current topics in space biorhythmology with regard to the prevention of desynchronization (a breakdown in the organism's daily cycle) in the space crew. Data are reviewed concerning human adaptability to phase shifts in sleep-waking patterns, and to days of extended length. Hypotheses are suggested concerning the establishment of adaptability limitations, based on theories of permanent information-energy values. S.C.S.

A77-50745 # Mechanisms for the formation of rheoophthalograms and electroplethysmograms of the eye (Mekhanizm formirovaniia reooftal'mogrammy i elektropletizmogrammy glaza). A. I. Kolinko (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR) and B. B. Zelikson. *Fiziologicheskii Zhurnal SSSR*, vol. 63, July 1977, p. 970-975. 21 refs. In Russian.

The ocular hemodynamics of cat subjects was studied on the basis of rheoophthalmographic and electroplethysmographic measurements. Rheograms were recorded of portions of ocular vascular tracts in the case of variations of eye pressure, induced by brief increases or decreases of central arterial pressure. A comparison of these variations with electroconductivity oscillations recorded during electroplethysmography suggests that these oscillations reflect changes of the linear speed of blood flow during one pulse cycle at frequencies exceeding 30 kHz. Slow oscillations of electroconductivity reflect changes in the blood volume in the tunics of the eye. B.J.

A77-50746 # Hemodynamics in the case of combining nociceptive stimulation with stimulation of the amygdaloid complex after acting upon the sensorimotor region of the cortex (Gemodinamika pri sochetanii notsitseptivnogo razdrazheniia i stimuliatsii mindalevidnogo kompleksa posle vozdeistviia na sensomotornuiu oblast' kory). L. S. Isakova and G. E. Danilov (Ministerstvo Zdravookhraneniia SSSR, Gosudarstvennyi Meditsinskii Institut, Izhevsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 63, July 1977, p. 988-996. 22 refs. In Russian.

A77-50747 # Energetics of the heart during hypothermia (Energetika serdtsa pri gipotermii). Iu. S. Aliukhin (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 63, July 1977, p. 1011-1015. 10 refs. In Russian.

The effect of cooling an isolated rat heart to a temperature of 27 C on the mechanical efficiency (the ratio of heart work to the total energy expenditure) and oxygen consumption of the heart was studied. It was found that at a hypothermia of 27 C, the mechanical efficiency of the heart increases, while the oxygen consumption of the arrested heart is cut in half. The increase in heart efficiency during hypothermia is shown to be conditioned primarily by a decrease in the rest metabolism of the heart. B.J.

A77-50748 # Acid-base equilibrium of rat blood during the combined action of hypercapnia, hypoxia and cooling (Kislotno-shchelochnoe ravnovesie krovi krys pri sochetannom vozdeistvii giperkapnii, gipoksii i okhlazhdeniia). V. I. Baev, L. M. Ovchinnikova, and I. P. Shcherbachev (Leningradskii Pediatricheskii Meditsinskii Institut, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 63, July 1977, p. 1026-1033. 15 refs. In Russian.

A77-50749 # Functional changes in the respiratory system of dogs in the case of alveolar hypoxia with hypercapnia (Funktsional'nye izmeneniia sistemy legochnogo dykhaniia u sobak pri al'veoliarnoi gipoksii s giperkapniei). L. N. Danilov, N. N. Kanaev, and E. S. Lebedeva (Ministerstvo Zdravookhraneniia, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Pul'monologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 63, July 1977, p. 1034-1039. 18 refs. In Russian.

A77-50750 # Use of a GL-5118 gas analyzer to measure the amount of oxygen consumption under conditions of increased pressure of the gaseous medium (Ispol'zovanie gazoanalizatora tipa GL-5118 dlia izmereniia kolichestva potrebliaemogo kisloroda v usloviiakh povyshennykh davlenii gazovoi sredy). N. M. Lobanov (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 63, July 1977, p. 1067-1070. In Russian.

A77-50751 Some influences of restraint harness design on accident pathology. D. C. Reader (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 916, 917.

Design requirements for restraint harnesses used by pilots are considered. Comfort, release, and use characteristics are examined. Harness system failures are analyzed and found to result from failures of quick release fittings, failures of strap material, and inefficient design. It is suggested that aviation pathologists can play an important role in the assessment of the efficiency of a restraint system in use, that is, that their assessment might be more revealing than that based on laboratory tests. M.L.

A77-50752 Crew behavior in accident causation. R. E. Yanowitch (FAA, Office of Aviation Medicine, Washington, D.C.). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 918-921.

The behavioral intercrew dynamics in three fatal air carrier accidents were investigated. A pilot in a flying situation is considered as a processor of information encompassing a system of behavior patterns; thus, accidents might result from a failure in the information processing modes. Four interrelated phases are distinguished in the processing system: (1) sensing the incoming information (perception), (2) analyzing and understanding the processed information (comprehension), (3) making a decision based on the understanding (decision), and (4) performing or not performing some physical act based on the decision (action). Conclusions concerning accident prevention are derived from this study. M.L.

A77-50753 Cause of death in aircraft accidents - Drowning vs. traumatic injuries. R. L. Thompson (U.S. Armed Forces Institute of Pathology, Washington, D.C.). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 924-928. 21 refs.

A77-50754 Laboratory examination of unidentified suspected tissue fragments found at aircraft sites. A. E. Petty and R. R. McMeekin (U.S. Armed Forces Institute of Pathology, Washington, D.C.). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 937-943. 14 refs.

A77-50755 Previous disease in aircrew killed in flying accidents. J. K. Mason (Edinburgh, University, Edinburgh, Scotland). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 944-948. 18 refs.

This review article discusses the role of previous disease in military, private, and commercial pilots under the headings of occurrence, accident causation, and accident prevention. The importance of minor disease in military flying is stressed as are psychiatric disorders and alcoholism in general aviation. Disease of the coronary arteries is considered with special reference to commercial operations where the importance of double crewing is emphasized. While symptomatic disease must always be significant, some of the problems associated with increasingly severe selection on the basis of asymptomatic disease are discussed. (Author)

A77-50756 Evaluation and disposition of Army helicopter aviators with finger amputations. P. V. Humbert (U.S. Army, Aeromedical Center, Fort Rucker, Ala.). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 949-952. 8 refs.

A77-50757 Sarcoidosis - A review of some features of importance in aviation medicine. I. R. Hill (RAF, Institute of Pathology and Tropical Medicine, Aylesbury, Bucks., England). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 953, 954. 11 refs.

Sarcoidosis is defined in terms of its histology and natural history. Emphasis is placed upon its insidious nature and potentially pronounced pathophysiological effects. The use of lung function studies as an index of disability in the three described phases is discussed. Although the disease has only coincidentally been found in aircraft accidents, stress is placed upon the need for careful monitoring of affected aircrew and the necessity for respiratory function tests. (Author)

A77-50758 Sarcoid and the heart - An aeromedical risk. F. S. Pettyjohn, D. H. Spoor, and W. A. Buckendorf (U.S. Army, Aeromedical Research Laboratory, Fort Rucker, Ala.). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 955-958. 22 refs.

Sarcoid lesions of the heart are reported in 13% to 20% of sarcoidosis patients. Sudden death and ventricular arrhythmias occur in 40% to 50%. In view of this frequency and life-threatening significance, review of military aircrew with documented sarcoidosis for myocardial involvement was undertaken. Case records were available for 11 U.S. Army, 19 U.S. Air Force, and 6 U.S. Navy patients. Four patients (11%) had significant cardiac abnormalities to include sustained ventricular arrhythmias, and acquired anteroseptal infarction pattern by ECG with normal coronary angiography. ECG abnormalities were found in eight additional patients. Suspected involvement of the heart in 33% of this series warrants complete cardiovascular evaluation of the sarcoid patient prior to return to flying duties. A case report demonstrates the difficulty in evaluating ECG abnormalities in the antemortem diagnosis of sarcoid heart disease. (Author)

A77-50759 Ischaemic heart disease - A problem in aircraft accident reconstruction. K. E. Underwood Ground (RAF, Institute of Pathology and Tropical Medicine, Aylesbury, Bucks., England). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 959-963. 10 refs.

A twin-engine light aircraft crashed at night on the third ILS approach. Runway Visual Range was 300 m. All four occupants were killed. The owner, aged 61, one of the two crew members, occupied the left-hand seat and was found to have an old, extensive antero-lateral infarct and severe coronary artery disease. There was no evidence of recent pathological change. A large number of drugs was found in the personal effects of the owner, including Allopurinol, Indomethacin, and Flurazepam. Subsequent investigation revealed that the owner had his PPL withdrawn 12 months prior to the accident on account of myocardial infarction. The problem of pilot control and the significance of cardiovascular disease as a possible cause for the accident are discussed. (Author)

A77-50760 Medical investigation of fatalities from aircraft-accident burns. M. J. Dunne, Jr. and R. R. McMeekin (U.S. Armed Forces Institute of Pathology, Washington, D.C.). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 964-968. 12 refs.

A77-50761 Studies on the relation between carboxyhemoglobin concentration and toxicity. L. R. Goldbaum, T. Orellano, and E. Dergal (U.S. Armed Forces Institute of Pathology; Washington Hospital Center, Washington, D.C.). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 969, 970. 5 refs.

A study was made on the effect of intraperitoneal (I.P.) injection of 100% CO in dogs. Although elevated concentrations of COHb were obtained, no CO toxicity occurred. As the combination of CO and erythrocytes after I.P. injection of CO should be similar to that after inhaling CO, the lack of toxicity cannot be explained by Drabkin's 'Haldane effect.' It is suggested that the lack of CO toxicity after I.P. injection was due to removal of dissolved CO from the blood by the lungs. On the other hand when CO is inhaled, there is significant dissolved CO in the blood when it reaches the organs. To cause toxicity, dissolved CO must be present in the blood to cross into the tissues and interfere with the combination of O2 and cytochrome a3. It is concluded that random COHb values may not be related to those obtained in studies of the relationship of human responses to COHb concentrations. (Author)

A77-50762 Round window tear in aviators. D. R. Tingley and J. A. MacDougall (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 971-975. 20 refs.

It is suggested that round window tear which affects the vestibular system might be responsible for some previously unexplained air crashes. Round window tears with the inherent symptomatology were detected in two aircrew members. The physiology of the round window membrane, the consequences of its rupture, the postulated mechanism of its rupture, and the diagnosis are discussed. Only some window tears cause vertigo, and this vertigo only sometimes causes prostration; but, in the future, it is urged that careful attention be paid to the ears of pilots recovered from what would otherwise appear to be a mysterious accident. M.L.

A77-50763 Correlation of occurrence of aircraft accidents with biorhythmic criticality and cycle phase in U.S. Air Force, U.S. Army, and civil aviation pilots. J. H. Wolcott, R. R. McMeekin (U.S. Armed Forces Institute of Pathology, Washington, D.C.), R. E. Burgin (National Transportation Safety Board, Washington, D.C.), and R. E. Yanowitch (FAA, Office of Aviation Medicine, Washington, D.C.). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 976-983. 11 refs.

The correlation of occurrence of aircraft accidents to critical and negative phases of the biorhythm cycles was investigated. Data from 880 U.S. Air Force pilot-involved accident cases were studied and added to 4,279 previously reported cases. The data were tested by chi-square analysis under the null hypothesis that there is no effect of biorhythm on aviation accidents. Under this hypothesis, the expected number of accidents occurring on critical days should be 179.13 for the U.S. Air Force; there were 179. In analyzing the effect of biorhythmic criticality for pilot-involved cases from all sources, there were 300 individual chi-square values computed. The frequency of these values by their percentile distribution so closely

matched the theoretical distribution that there was no evidence whatsoever to indicate an effect of biorhythmic criticality. There was no correlation between multiply negative or individually negative phases of the biorhythm cycles and aircraft accidents in the U.S. Air Force or in the combined pilot-involved accident group. (Author)

A77-50764 Metabolic responses to exercise in three thermal environments. C. L. Wells and A. M. Paolone (Temple University, Philadelphia, Pa.). *(Joint Committee on Aviation Pathology, Annual Meeting, Sept. 1976, Aylesbury, Bucks., England.) Aviation, Space, and Environmental Medicine*, vol. 48, Oct. 1977, p. 989-993. 11 refs.

The paper reports the respiratory parameters of 'physically active' but untrained subjects who walked on a treadmill grade at 25, 32, and 40 C (relative humidity 5-55%). The changes in oxygen uptake which occurred at the different temperatures are described. It is suggested that as the temperature increased, blood flow was diverted from metabolically active muscle to nonmetabolically active tissue to enhance heat dissipation via conduction and convection. As a result, oxygen extraction declined, and an increased respiratory drive was incurred. M.L.

A77-50806 # The proprioceptive contour as a linearizer of the eye movement system (Propriotseptivnyi kontur kak linearizator glazodvigatel'noi sistemy). E. A. Ivanov. *Problemy Bioniki*, no. 16, 1976, p. 119-127. In Russian.

The paper examines a dynamic model of visual-movement coordination with the intention of indicating the possibility of a vibrational linearization of the contour of the visual correction at the expense of fluctuations arising in the proprioceptive contour during acute physiological tremor. Analysis of the model and comparison with experimental data suggest that linearization of the contour of a visual correction is quite possible. M.L.

A77-50909 # The problem of constructing bioamplifiers for dynamic biotelemetry studies (K voprosu postroeniia biousilitelia dlia dinamicheskikh biotelemetricheskikh issledovanii). O. E. Levitskii. *Otbor i Peredacha Informatsii*, no. 51, 1977, p. 74-82. 9 refs. In Russian.

The paper considers the principal technical and design requirements of a solid state amplifier of biosignals intended for use in multipurpose systems of dynamic biotelemetry (EEG and EKG systems are considered here as example). Such requirements as dynamic range, supression of synphase noise, static voltage-gain coefficient and noise level are considered. Circuit diagrams of two integrated FET bioamplifiers are presented. B.J.

A77-50922 # The functional state of the hypothalamus-pituitary-adrenal cortex system as a criterion for setting a standard for microwave radiation (Funktsional'noe sostoianie sistemy gipotalamus-gipofiz-kora nadpochechnikov kak kriterii pri normirovanii SVCh EM izluchenii). A. A. Novitskii, B. F. Murashov, P. E. Krasnobaev, and N. F. Markizova. *Voenno-Meditsinskii Zhurnal*, Aug. 1977, p. 53-56. In Russian.

The effect of 12.6 cm microwave radiation on hormone activities in rats was studied. Levels of corticotropin releasing factor in a hypothalamus extract (to measure hypothalamic activity), ACTH (to measure pituitary activity), 11-oxycorticosteroid in blood (to measure the glucocorticoid function of the adrenal cortex), and sodium and potassium in plasma and erythrocytes (to measure mineralocorticoid activity) were determined in two experiments: in the first, all animals were exposed 30 minutes to radiation ranging from 0.01 to 75 mV/sq cm; and in the second, animals received 1 mV/sq cm for 10, 20, or 30 days. In the first experiment, even 0.01 mV/sq cm caused differences between experimental and control rats. In the second experiment, significant differences between experimental and control rats were found for all hormone and electrolyte levels for all time periods, except for sodium levels in plasma and in erythrocytes after 30 days of exposure. M.L.

A77-50923 # The ability to endure Coriolis force and some questions of vestibular choice (Perenosimost' uskorenii Koriolisa i nekotorye voprosy vestibuliarnogo otbora). V. V. Usachev. *Voenno-Meditsinskii Zhurnal*, Aug. 1977, p. 61-63. 11 refs. In Russian.

The ability of flight personnel and candidates to an aviation school to endure Coriolis force was studied by two test procedures, the Brianov and the Markarian. The ability to endure was determined by clinical signs, and both vegetative and motor reactions were considered. Endurance lasted for a shorter period of time when the Brianov procedure was used (e.g., two minutes in comparison with three minutes as found by the Markarian procedure). Cumulative and noncumulative effects of one or two minutes of testing were also studied. The responses of flight personnel with health defects to noncumulative Coriolis force were compared with the responses of healthy flight personnel. M.L.

A77-50924 # Repeated examination in a low-pressure chamber of pilots with reduced ability to endure hypoxia (Povtornoe obsledovanie v barokamere letchikov s ponizhennoi perenosimost'iu gipoksii). N. N. Artamonov, S. F. Raev, and R. V. Beleda. *Voenno-Meditsinskii Zhurnal*, Aug. 1977, p. 63-65. In Russian.

Levels of adrenalin, noradrenalin, their precursors dopamine and DOPA, and 17-oxycorticosteroid were determined in three groups of pilots who showed a reduced ability to endure hypoxia. The three groups consisted of people who consistently, occasionally, or episodically showed the reduced ability. Medical reasons for the disability are considered. The results are discussed with reference to the choice of the length of time that should elapse before retesting. An explanation is offered to account for the pattern of return to a normal response to hypoxia, with attention directed to the role of the sympathetic system. M.L.

A77-51215 # Mean skin temperature weighted with both ratios of heat transfer coefficient and body surface area. T. Mochida (Hokkaido University, Sapporo, Japan). *Hokkaido University, Faculty of Engineering, Bulletin*, Sept. 1977, p. 15-26. 10 refs.

The purpose of the present paper is to present a calculation formula for mean skin temperature, weighted with ratios of heat transfer coefficient and body surface area and also to run a comparison against ordinary mean skin temperature formulas previously proposed. Although various mean skin temperatures weighted with body area ratio alone has been generally used, if derived by considering the heat balance between man and his immediate environment, the mean skin temperature should include both convective and radiative heat transfer coefficients in addition to the skin area ratios. In the present study, a general equation for calculating mean skin temperature weighted with the heat transfer coefficient and skin area is derived and a concrete calculating formula in the case of dividing the entire human body into six main parts is proposed by substituting definite values into the weighting factors in the general equation. (Author)

A77-51260 * Finite element stress analysis of the human left ventricle whose irregular shape is developed from single plane cineangiocardiogram. D. N. Ghista (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif.) and M. S. Hamid (Indian Institute of Technology, New Delhi, India). *Computer Programs in Biomedicine*, vol. 7, Sept. 1977, p. 219-231. 10 refs.

The three-dimensional left ventricular chamber geometrical model is developed from single plane cineangiocardiogram. This left ventricular model is loaded by an internal pressure monitored by cardiac catheterization. The resulting stresses in the left ventricular model chamber's wall are determined by computerized finite element procedure. For the discretization of this left ventricular model structure, a 20-node, isoparametric finite element is employed. The analysis and formulation of the computerised procedure is presented in the paper, along with the detailed algorithms and computer programs. The procedure is applied to determine the stresses in a left ventricle at an instant, during systole. Next, a portion (represented by a finite element) of this left ventricular chamber is simulated as being infarcted by making its active-state modulus value equal to its

passive-state value; the neighbouring elements are shown to relieve the 'infarcted' element of stress by themselves taking on more stress. (Author)

A77-51493 Biomedical aspects of the mastering of outer space with the aid of remotely controlled devices. O. G. Gazenko, V. I. Miasnikov, and V. P. Nekrasov (Ministry of Health of USSR, Institute of Biomedical Problems, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-242.* 7 p.

Criteria for selection and training of crew and driver of planetary rovers are addressed. The latent period of visual-motor and discrimination reactions, static tremor, time required to solve arithmetic problems, and time required to complete searches for tabulated figures were studied, along with an estimation of neuropsychic stress in relation to heart rate and electric skin resistance. Motivation, hierarchy of goals, and appreciation of the importance of the particular job are found to be of paramount importance in performance results. Rover-drivers appear subject to the greatest stress. The need to schedule regular meaningful work for rover-operator-trainees and to monitor the state of work capacity and neuropsychic activity of operators both before and during real work is emphasized. R.D.V.

A77-51494 A study of the crew metabolic contribution into the space cabin atmosphere during space flights. V. P. Savina, K. N. Mikos, V. V. Ryzhkova, A. I. Gorshunova, Iu. G. Nefedov, V. V. Lepskii, and V. V. Aksenov (Ministry of Health of USSR, Institute of Biomedical Problems, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-243.* 5 p.

Volatile organic compounds sampled from the space cabin atmosphere during the flight of Soyuz-22 were analyzed by gas-liquid chromatography in a study of levels of contamination. The contaminants identified, due to such mission-related factors as the crew regimen, diet and hygienic support, included methane, methanol, acetaldehyde and acetone. Comparable experiments conducted in simulated ground-based space cabins suggest that the concentration of contaminants, dependent on the efficiency of the purification system, the number of crew-members and other variables, generally reaches a maximum after five to seven days and subsequently remains constant. J.M.B.

A77-51495 Problems of ecological psychology during prolonged stay in sealed chambers. A. A. Losev, V. I. Miasnikov, and M. A. Novikov (Ministry of Health of USSR, Institute of Biomedical Problems, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-244.* 4 p.

The paper briefly discusses results of long-term (up to 120 days) experiments carried out in the period 1974-1977, in which engineers and physicians participated as subjects in closed environments consisting of different types of cabin atmospheres. It was found that individual response to the physical parameters of the environment is determined to a large extent by psychological factors, such as motivation, high spiritual requirements and social aims. As an example, a subject could tolerate harsh combinations of CO_2 concentrations (up to 3.5%), heat and high humidity, while the recorded data indicated a somatic deterioration. B.J.

A77-51498 On the possibilities of prediction of differences in radiation resistance of individuals. M. Pospisil (Ceskoslovenska Akademie Ved, Biofyzikalni Ustav, Brno, Czechslovakia). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-250.* 6 p. 9 refs.

Electrolyte homeostasis, adrenal cortex function and energetic metabolism were studied in laboratory animals subjected to high levels of X-ray radiation; the results may have relevance to the selection of crews for space missions, where individual differences in radiation resistance are important. The degree of fluctuation in the sodium/potassium ratio of urine was used as a measure of electrolyte regulation in rats subjected to X-ray exposure. The effect of high doses of radiation on urine ketosteroid levels (an indication of corticoadrenal activity) and respiratory gas exchange in the animals was also monitored. Nonlinear relationships between observed radiation resistance and each of the three measures of homeostatic regulation are interpreted as possible prognostic devices. J.M.B.

A77-51499 Problems of rehabilitation and recovery of altered physiological functions after space flight. T. N. Krupina, B. M. Fedorov, Kh. Kh. Iarullin, N. A. Belaia, E. I. Matsnev, and V. T. Olefirenko (Ministry of Health of USSR, Institute of Biomedical Problems, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-253.* 4 p.

Postflight examinations of Soyuz and Salyut crews have shown that space flight effects produce changes in various systems of the human body: a decrease of orthostatic and exercise tolerance, changes in posture, equilibrium and gait, decline of the tone and strength of the antigravity muscles, metabolic changes, asthenization phenomena, etc. This paper describes experiments conducted in the period 1973-1975 in an effort to develop postflight rehabilitation measures applied to individual body-changes. The measures included a combination of physical exercise, balneotherapy, drugs and diets. B.J.

A77-51501 Reaction of the adrenal cortex and medulla to prolonged space flight in Wistar rats. R. Kvetnansky, P. A. Tigranian, T. Torda, D. Repcekova, E. Jahnova, and K. Murgas (Slovak Academy of Sciences, Institute of Experimental Endocrinology, Bratislava, Czechoslovakia; Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-261.* 6 p. 14 refs.

Concentrations of corticosterone and adrenal catecholamines in rats subjected to 20 days of weightlessness on board the Cosmos 782 satellite were compared with similar measurements made for control groups. The functioning of catecholamine-synthesizing and -degrading enzymes was also studied. Although increases were found in the size of the adrenal glands of rats subjected to weightless conditions, no indication of chronic or severe stress, as determined from activation of the adrenal-cortical and medullary systems, was noted. J.M.B.

A77-51502 Some results of biological investigations aboard the biosatellite Cosmos-782. G. P. Parfionov, R. N. Platonova, M. G. Tairbekov, Iu. N. Belenev, V. P. Olkhovenko, A. V. Rostopshina, and E. A. Oigenblick (Academy of Sciences, Intercosmos Council, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-262.* 5 p.

A series of experiments was carried out during the flight of the Soviet biosatellite Cosmos-782 (1975) to study the effects of zero-g and altered-g on plant and animal morphogenesis, physiology, and structure. The experiments included: (1) genetic investigations of fruit flies (Drosophila melanogaster), (2) studies of Fundulus heteroclitus eggs and fry, and (3) studies of the growth, development, and orientation of pine (Pinus silvestris) and crepis (Crepis capillaris) seeds. It was found that in general weightlessness does not affect the basic biological functions other than those formed under its direct influence (such as geostimulation in the germination of seeds), and that natural and artificial gravity exhibit no basic differences. S.C.S.

A77-51503 Plasma and tissue lipid changes in rats irradiated in cosmic space. I. Ahlers, R. A. Tigranian, E. Ahlersova, Iu. G. Grigor'ev, M. Praslicka, and E. Paulikova (Univerzita Pavla Jozefa Safarika, Kosice, Czechoslovakia; Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-263.* 8 p. 6 refs.

Male rats were irradiated with either 0, 220, or 800 rads of gamma rays aboard the biosatellite Kosmos-690. Rats on earth received the same irradiation. One and 26 days after the flight ended (or 12 and 38 days after irradiation) the plasma and lipid changes in the rats were determined and compared to levels found in controls. Irradiation caused increased levels of triglycerides, cholesterol, and nonesterified fatty acids in various tissues, and these changes were more pronounced in the animals irradiated in space. However, the data are interpreted to suggest that repair processes worked more efficiently in animals irradiated in space. M.L.

A77-51504 Effect of space flight factors on glycogen metabolic system and on ionic composition of rat skeletal muscle. V. P. Nesterov, Z. P. Zheludkova, and L. A. Kuznetsova (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-264.* 6 p. 8 refs.

Male albino rats were used in a series of experiments to investigate the state of muscle tissues at extreme conditions of space flights. The tests included a study of cation composition in functionally different skeletal muscles, and glycogen phosphorylase activity. It was found that rats onboard the biosatellite manifest an irreversible increase in glycogen phosphorylase activity in fast skeletal muscles (m. gastrocnemius and m. tibialis), and retain total enzymic catalytic activity. Temporary dehydration of m. plantaris and m. phrenicus is observed, along with other indications suggesting regressive changes in intracellular ionic homeostasis of m. soleus during prolonged periods of weightlessness. It is concluded that an artificial load on slow-twitch antigravitational skeletal muscles is necessary onboard spacecraft. S.C.S.

A77-51505 Influence of irradiation and space flight factors of nucleic acids and deoxyribonucleoprotein in liver and spleen of rat. E. Misurova, R. A. Tigranian, K. Kropacova, Iu. G. Grigor'ev, and M. Praslicka (Univerzita Pavla Jozefa Safarika, Kosice, Czechoslovakia; Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-265.* 9 p. 7 refs.

Nucleic acid and deoxyribonucleoprotein concentrations in the liver and spleen of irradiated (220-800 rads) and nonirradiated rats are studied in order to evaluate changes caused by the space flight environment, including weightlessness. The results are compared with those of a simulation experiment and previous research. It is found that neither the space flight environment nor irradiation causes changes in liver concentrations of nucleic acid or deoxyribonucleoprotein. A decrease in the amount of nucleic acid, and an increase in the level of soluble polydeoxyribonucleotides are observed in the spleen of rats exposed to the space flight environment, perhaps caused by gravity stress. Accumulated effects are not observed in rats irradiated in space, although the damage is more severe in comparison with the effects of a single flight. S.C.S.

A77-51506 Reparative processes in spleen and peripheral blood after the outset of continuous irradiation. N. Mackova and M. Praslicka (Univerzita Pavla Jozefa Safarika, Kosice, Czechoslovakia). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-266.* 10 p. 11 refs.

The effect of various radiation dose rates on the spleen, bone marrow and peripheral blood of mice was monitored up to 90 days following irradiation. Gamma ray doses of 50, 100 or 500 roentgens were administered daily to three experimental groups until the total irradiation level for each group reached 1000 roentgens; a control group and a set of mice exposed to a total dose of 2000 roentgens were also studied. Restoration of normal lymphopoiesis in the white pulp of the spleen was noted after 60 days in mice subjected to the lowest two radiation dose rates, and after 90 days in those animals subjected to daily doses of 500 roentgens. Recovery of erythropoiesis functioning appeared to occur more rapidly. Restoration of erythrocyte, thrombocyte and granulocyte production to normal levels was found to take place sooner than recovery of agranulocyte production. J.M.B.

A77-51507 The effect of prolonged space flight on liver enzyme activities and on lipogenesis in adipose tissue of rats. L. Macho, S. Nemeth, M. Palkovic, V. Strbak, and R. A. Tigranian (Slovak Academy of Sciences, Institute of Experimental Endocrinology, Bratislava, Czechoslovakia; Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-267.* 7 p. 14 refs.

Glucocorticoid-dependent enzyme activity, enzyme functioning associated with lipogenesis in the liver and the rate of lipid biosynthesis in adipose tissue were studied in rats flown for 20 days aboard the Cosmos 782 satellite, as well as in two control groups. Enhanced enzyme activity in the liver, possibly as a consequence of exposure to acute stress, was found for the rats flown on the satellite. In addition, alterations in the rate of incorporation of glucose into the lipid fraction of adipose tissues were noted in rats subjected to weightlessness; these changes in lipid metabolism persisted during a 26-day period of readaptation to earth gravity conditions. J.M.B.

A77-51519 The probability of decompression sickness as a result of going out in a pressure suit from a spacecraft with an atmosphere close to that on earth. A. S. Barer, L. G. Golovkin, S. N. Filipenkov, I. N. Cherniakov, and A. A. Sheikin (Academy of Sciences, Intercosmos Council, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper A-77-41.* 7 p. 10 refs.

The literature (describing 536 experiments performed over the last 15 years) on decompression sickness caused by leaving a spacecraft in a pressure suit is reviewed. An analysis of cases when the sickness occurred and when it did not occur indicates that it is safe to leave a spacecraft with a simulated earth-atmosphere, wearing a pressure suit with an abs. pressure of 38.7 plus or minus 2.7 kP. Transitions to abs. pressures of 21.3-30.7 kP from the above-specified pressure may lead to decompression sickness. B.J.

A77-51567 Application of optimal and adaptive algorithm control to the system robot-manipulator in cosmic space. P. Neuman (Prague, University, Prague, Czechoslovakia). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-ST-02.* 22 p. 6 refs.

Mathematical models of spacecraft robot-manipulators are considered with reference to the development of an exact control algorithm which ensures the generation of a specific trajectory. Pontriagin's maximum principle is applied, and equivalent initial conditions are solved by means of sensitivity methods which rely on an iterative process. The derived method permits the realization of optimal control of a real mechanical system operating in real time. The method was tested by means of a simple model of a manipulator with the mass concentrated to the mass point. M.L.

A77-51616 * **An electrode system for tetrapolar electrical impedance plethysmography of the finger.** L. D. Montgomery, D. L. Moody, Jr., and B. A. Williams (NASA, Ames Research Center, Moffett Field, Calif.). *IEEE Transactions on Biomedical Engineering*, vol. BME-24, July 1977, p. 385, 386. 5 refs.

A rigid band electrode system is described which facilitates location of the recording electrodes of a tetrapolar impedance plethysmograph used for measuring pulsations of blood in a finger segment. The electrodes can be relocated accurately, and the volume of the finger segment under study can be precisely defined. The new system ensures good electrical contact and minimizes movement artifacts in the plethysmograph trace by holding the finger segment in a firm position. (Author)

A77-51617 * **Origins of serotonin innervation of forebrain structures.** K. J. Kellar, P. A. Brown, J. Madrid, M. Bernstein, J. Vernikos-Danellis, and W. R. Mehler (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif.). *Experimental Neurology*, vol. 56, July 1977, p. 52-62. 20 refs.

The tryptophan hydroxylase activity and high-affinity uptake of (3H) serotonin ((3H)5-HT) were measured in five discrete brain regions of rats following lesions of the dorsal or median raphe nuclei. Dorsal raphe lesions reduced enzyme and uptake activity in the striatum only. Median raphe lesions reduced activities in the hippocampus, septal area, frontal cortex, and, to a lesser extent, in the hypothalamus. These data are consistent with the suggestion that the dorsal and median raphe nuclei are the origins of two separate ascending serotonergic systems - one innervating striatal structures and the other mesolimbic structures, predominantly. In addition, the data suggest that measurements of high-affinity uptake of (3H)5-HT may be a more reliable index of innervation than either 5-HT content or tryptophan hydroxylase activity. (Author)

STAR ENTRIES

N77-32707 Deutscher Wetterdienst, Offenbach am Main (West Germany).
REPORTS FROM THE GERMAN METEOROLOGICAL SERVICE. VOLUME 18, NO. 142: THE WEATHER DEPENDENT YIELD OF SOME SHORTLIVING FOOD PLANTS [BERICHTE DES DEUTSCHEN WETTERDIENSTES NR. 142 (BAND 18). DIE WITTERUNGSABHAENGIGE ETAGSBILDUNG EINIGER KURZLEBIGER FUTTERPFLANZEN]
Rudolf Beinhauer 1977 53 p refs In GERMAN; ENGLISH summary
(ISBN-3-88148-125-7; ISSN-0072-4130) Avail: Issuing Activity

From August 1972 until July 1975 qualitative and quantitative dry matter yield investigations were conducted of rape seed (brassica napus, brassica rapa), white mustard (sinapis alba), oil radish (raphanus sativus), ryegrass (lolium multiflorum), red clover (trifolium pratense), and grassland as depending on photosynthetic active radiation, air temperature and soil temperature, soil moisture, and relative humidity of the air. Regressive yield relations and optimal soil moisture regimes are discussed. Yield limiting weather parameters in spring and autumn were photosynthetic active radiation and temperature. The starting temperature of the growing season of rape seed is 2.6 C (5.4 C soil temperature) and differed significantly from grassland and ryegrass with 4.6 C (8.5 C) and red clover with 9.1 C (10.1 C). This accounts for a 30 day difference between rapeseed and grassland. Each species governs its specific growing period. The efficiency of the photosynthetic active radiation spans between 1.4 % (red clover) and 4.5 % (white mustard). Relative humuidity above 85 % is yield depressing. Author (ESA)

N77-32708*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
FEASIBILITY STUDY ON THE DESIGN OF A PROBE FOR RECTAL CANCER DETECTION
V. J. Anselm, R. E. Frazer, D. H. LeCroisset, J. A. Roseboro, and M. I. Smokler 15 Apr. 1977 25 p refs
(Contract NAS7-100)
(NASA-CR-155043; JPL-Publ-77-31) Avail: NTIS HC A02/MF A01 CSCL 06E

Rectal examination techniques are considered in terms of detection capability, patient acceptance, and cost reduction. A review of existing clinical techniques are considered in terms of detection capability, patient acceptance, and cost reduction. A review of existing clinical techniques and of relevant aerospace technology included evaluation of the applicability of visual, thermal, ultrasound, and radioisotope modalities of examination. The desired improvements can be obtained by redesigning the proctosigmoidoscope to have reduced size, additional visibility, and the capability of readily providing a color photograph of the entire rectosigmoid mucosa in a single composite view. Author

N77-32709# Army Medical Intelligence and Information Agency, Washington, D. C.
ESTIMATE OF THE PERCEPTIVE LOAD BY VARIABILITY OF RATE OF HEARTBEAT
R. Auffret, H. Seris, A. Berthoz, and B. Fatras 19 Jul. 1977 3 p refs Transl. into ENGLISH from Le Travail Humain (France), v. 30, no. 3-4, 1967 p 309-310
(AD-A042495; USAMIIA-K-8300) Avail: NTIS HC A02/MF A01 CSCL 05/5

The load undergone by a subject during aeronautical work is essentially perceptive. Its estimate is necessary for the human factor engineering study of an operation station. GRA

N77-32710# Army Environmental Hygiene Agency, Aberdeen Proving Ground, Md.
EVALUATION OF THE POTENTIAL RETINAL HAZARDS FROM OPTICAL RADIATION GENERATED BY ELECTRIC WELDING AND CUTTING ARCS Radiation Protection Special Study, Dec. 1975 - Apr. 1977
Wesley J. Marshall, David H. Sliney, Terry L. Lyon, Nicholas P. Krial, and Pedro F. DelValle 16 Aug. 1977 268 p refs
(AD-A043023; USAEHA-42-0312-77) Avail: NTIS HC A12/MF A01 CSCL 06/18

A special study of the potential retinal hazards from direct viewing of various welding processes was conducted by the US Army Environmental Hygiene Agency as part of a cooperative effort with the American Welding Safety Committee on Safety and Health of the Project Committee on Radiation. It was determined that potentially hazardous levels of visible radiation were emitted by all of the welding processes that were evaluated and that recommended filter shade numbers were generally adequate. These processes included: gas tungsten arc welding, flux cored arc welding, plasma arc cutting, plasma arc welding and shielded metal arc welding. Author (GRA)

N77-32711# Augenklinik des Zentralkrankenhauses, Bremen (West Germany).
THE DEPENDENCE OF INTRAOCULAR PRESSURE AND CENTRAL ARTERY COLLAPSE PRESSURE UPON WEIGHTLESSNESS. METHODICAL APPROACH TO EXPERIMENTS DURING SPACELAB FLIGHT [DIE ABHAENGIGKEIT VON AUGENINNENDRUCK UND ZENTRALARTERIENKOLLAPSDRUCK VOM EINFLUSS DER SCHWERELOSIGKEIT. METHODISCHE UEBERLEGUNGEN ZU EXPERIMENTEN WAEHREND DES SPACELAB-FLUGES]
J. Draeger 1976 11 p refs In GERMAN Presented at the 15th DGLR Meeting, Saint Louis, France, 17-19 Nov. 1976
Avail: NTIS HC A02/MF A01

Equipment is discussed for measuring intraocular pressure and central retina artery collapse pressure onboard Spacelab to determine the effects of weightlessness. A range of tonometers is described for measurement of intraocular pressure, and a range of dynamometers for measuring arterial collapse. ESA

N77-32712# Bureau of Radiological Health, Rockville, Md. WHO Collaborating Center for Standardization of Protection Against Nonionizing Radiations.
BIOLOGICAL EFFECTS OF ELECTROMAGNETIC WAVES. SELECTED PAPERS OF THE USNC/URSI ANNUAL MEETING, VOLUME 1
C. Johnson, ed. (Utah Univ., Salt Lake City) and M. Shore, ed. Apr. 1977 508 p refs Meeting held at Boulder, Colo., 20-23 Oct. 1975 Sponsored in part by Intern. Union of Radio Science, Washington, D. C.
(PB-268094/0; DHEW/PUBL/FDA-77/8010; FDA/BRH-77197) Avail: NTIS HC A22/MF A01 CSCL 06R

Topics recorded from this conference include: (1) theoretical analysis of microwave-generated auditory effects in animals and man; (2) microwave-induced auditory response-cochlear microphonics; (3) chronic low-level exposure of rabbits to microwaves; (4) the effects of microwave radiation on behavior and temperature in Rhesus monkeys; (5) modification of internal discriminative stimulus control of behavior by low levels of pulsed microwave radiation; (6) physiological and behavioral effects of chronic low level microwave radiation in rats; (7) histological observations on central nervous system; (8) interactions between nervous tissues and weak environmental electric fields; (9) pseudosubstrate binding to ribonuclease during exposure to microwave radiation at 1.70 and 2.45 GHz; (10) mutagenicity induced by

non-ionizing radiation in Swiss male mice; and (11) the effects of 19 megacycle irradiation on mice and rats. GRA

N77-32713# Minnesota Univ., Minneapolis. Dept. of Mechanical Engineering.
FLUID DYNAMICS OF BLOOD CELLS AND APPLICATIONS TO HEMODIALYSIS Annual Progress Report, 15 Oct. 1975 - 15 Oct. 1976
Perry L. Blackshear, Jr. and Richard T. Forstrom 24 Nov. 1976 37 p refs
(Contract AM-2-2207)
(PB-268346/4; AK-5-2-2207) Avail: NTIS HC A03/MF A01 CSCL 06B

Work on the blood access device (a self-sealing button attached to segment of prosthetic artery) has proved sufficiently promising in dog tests that plans are being formulated to mass produce and mass test the device prior to human implantation. It was found that when the duration of a test is properly accounted for, continuous filtration polarization for a diffusible solute theory supplies an upper bound for the 1 micron and platelet data. Wall repulsion effects were apparent but less pronounced than expected. GRA

N77-32714# Minnesota Univ., Minneapolis. Dept. of Medical Engineering.
FLUID DYNAMICS OF BLOOD CELLS AND APPLICATIONS TO HEMODIALYSIS Annual Report, 15 Oct. 1975 - 15 Oct. 1976
Perry L. Blackshear, Jr. and Ronald L. Wathen 15 Oct. 1975 39 p refs Prepared in cooperation with Minneapolis Medical Research Foundation
(Contract AM-2-2207)
(PB-268420/7; AK-6-2-2207) Avail: NTIS HC A03/MF A01 CSCL 06B

Autogenous artery grafts were formed in situ with a Sparks mandril. Fourteen dogs have had the device implanted and nine have been hooked up as A-V shunts. Results were not encouraging. Clotting was seen in four dogs due to pseudointimal proliferation in the graft. The access device with polytetrafluorethylene (PTFE) blood channel has been implanted in eight dogs. With the exception of two dogs lost to incisional wound infection, these grafts have functioned well. Fistulogram of one dog with Conray-40 and a rapid sequence X-ray machine showed the A-V channel to be perfectly clean. One dog was electively autopsied after over three months of having a functioning graft. GRA

N77-32715# Permanent Commission and International Association of Occupational Health. Subcommittee on the Toxicology of Metals.
TOXICOLOGY OF METALS, VOLUME 2
Lars Friberg May 1977 492 p refs Prepared in cooperation with the Natl. Swed. Environment Protect. Board, Stockholm and the Karolinska Institutet, Stockholm
(Contract EPA-68-02-1287)
(PB-268324/1; EPA-600/1-77-022-Vol-2) Avail: NTIS HC A21/MF A01 CSCL 06T

Reviews of 23 metals are included in this report on metal toxicology. Chemical properties, and chemical analysis are given for each metal as well as their effects on human metabolism. The metals covered are aluminum antimony, arsenic, barium beryllium, bismuth, cadmium, chromium, cobalt, copper, germanium, indium, lead, mercury, molybdenum, silver, tellurium, thallium, tin, titanium, tungsten, uranium, and zinc. GRA

N77-32716# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
IMPACT OF NOISE CONTROL AT THE WORKPLACE. VOLUMES 1 AND 2, APPENDICES A-G AND VOLUME 3, APPENDICES H AND I (ECONOMETRIC SIMULATION) Final Report
R. D. Bruce, G. W. Beckwith, W. E. Biker, G. E. Fax, and H. L. Fox 1 Jan. 1974 226 p refs
(Contract DL-73-112)
(PB-268231/8; BBN-2671-Vol-1; BBN-2671-Vol-2; BBN-2671-Vol-3; OSHA/EI-74-0-101) Avail: NTIS HC A11/MF A01 CSCL 06J

Industrial noise exposure criterion is considered by estimating the costs to manufacturing industries in meeting the standard, estimating the effects of these costs on the nation's economy, estimating the benefits to production workers of the reduced noise levels, and estimating the impact of the increased demand on noise-control-related industries. Alternative noise control programs considered are those designed to achieve maximum compliance with the present standard, using present technology, within three and five year periods respectively. GRA

N77-32717# Air Force Human Resources Lab., Brooks AFB, Tex.
THE EFFECTS OF SYSTEM AND ENVIRONMENTAL FACTORS UPON EXPERIENCED PILOT PERFORMANCE IN THE ADVANCED SIMULATOR FOR PILOT TRAINING Final Report, May 1975 - Oct. 1976
Phillip A. Irish, III, Paul M. Grunzke, Thomas H. Gray, and Brian K. Waters Apr. 1977 61 p
(AF Proj. 1123)
(AD-A043195; AFHRL-TR-77-13) Avail: NTIS HC A04/MF A01 CSCL 14/2

The objectives of the study were: (a) to assess the relative contribution of platform motion, G-seat and visual factors to pilot performance in the Advanced Simulator for Pilot Training (ASPT); (b) to acquire information on the relationships between system output and pilot input measures as collected in the ASPT; and (c) to evaluate the utility of economical multifactor designs for Flying Training Division, Air Force Human Resources Laboratory (AFHRL/FT) research in flight simulation. Three experienced T-37 pilots flew five maneuvers in the ASPT under combinations of the independent variables: platform motion, G-seat, field of view, turbulence, wind and ceiling/visibility. Automated performance measures based on system parameters, pilot inputs and derived scores were collected and analyzed. Both main and interactive effects of the independent variables were found for a majority of the maneuvers. A discussion of the utility of the economical multifactor designs is included. Additionally, implications for determining the direction of future studies are discussed. Author (GRA)

N77-32718# Memphis State Univ., Tenn.
FLEXILEVEL ADAPTIVE TESTING PARADIGM: VALIDATION IN TECHNICAL TRAINING Final Report, May 1975 - Mar. 1977
Duncan N. Hansen, Steven Ross, and Dickie A. Harris Jul. 1977 21 p
(Contract F41609-75-C-0040; AF Proj. 1121)
(AD-A042977; AFHRL-TR-77-35(I)) Avail: NTIS HC A02/MF A01 CSCL 09/5

This study was designed to empirically assess a computerized adaptive testing model in an ongoing technical training system. The model was a modification of Lord's flexilevel paradigm and consisted of: the sequencing of test items in a difficulty hierarchy, adaptive entry of students into the test at a difficulty level appropriate to their predicted score, and systematic movement of students up and down the hierarchy based upon their performance on preceding items. The subjects were 444 airmen enrolled in the Inventory Management/Materiel Facilities Course at Lowry Air Force Base, Colorado. They participated in the study as part of the normal achievement testing requirement for Block II of the course. Predictor variables for individualized entry were three reading tests administered to students prior to course enrollment. A within-subject design was employed in comparing the adaptive strategy to conventional testing on dependent variables or performance, test reliability, and test time. This involved first administering items according to the flexilevel algorithm and then, after the student exited from the test at either the top or bottom end of the hierarchy, presenting all remaining items. Consequently, both adaptive and conventional test scores were obtained for each subject. The results revealed a high positive part-whole correlation between flexilevel and total test scores. Internal consistency indices for the two forms were essentially equivalent. With regard to length and time, however, the flexilevel test required nine less items than the entire test, yielding a length reduction of 39.5 percent with a concomitant time savings of 18.4 percent. GRA

N77-32719# Boeing Aerospace Co., Seattle, Wash.
STEREO ACUITY AND RECONNAISSANCE. PHASE 2: DEVELOPMENT OF A FOVEAL-PARAFOVEAL CHROMO-STEREOPSIS TEST Final Report, Jan. 1976 - Jan. 1977
Conrad L. Kraft and Charles D. Anderson Wright-Patterson AFB, Ohio AMRL Jun. 1977 88 p refs
(Contract F33615-74-C-4037)
(AD-A043258; AMRL-TR-77-34) Avail: NTIS HC A05/MF A01 CSCL 17/2

A Foveola/Parafoveal or circular staircase test (F/P CST) was designed, developed and evaluated. Three small sample populations (total of 30 observers) were used in investigations of stereoscopic acuity and chromostereopsis. Specific attention was paid to the effect of interchanging the color of the stimuli within the foveola and that within the fovea or parafovea. Marked individualistic effects and large chromostereoscopic changes were observed. The form of the test was that of a central 58 arc minutes disc surrounded by a spiral of wedges that gave the appearance of a circular staircase as viewed from above. GRA

N77-32720# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
A REVIEW OF METHODS FOR ESTIMATION OF AEROACOUSTIC LOADS ON FLIGHT VEHICLE SURFACE, VOLUME 2 Final Report, Jan. 1975 - Jul. 1976
Eric E. Ungar, John F. Wilby, Donald B. Bliss, B. Pinkel, and A. Galaitsis 3 Mar. 1977 319 p refs
(Contract F33615-75-C-3017)
(AD-A042783; BBN-3260-Vol-2; AFFDL-TR-76-91-Vol-2) Avail: NTIS HC A14/MF A01 CSCL 20/1

Alternative techniques for predicting the aeroacoustic loads that act on flight vehicle surfaces due to propulsion and powered lift systems, surface flow, and armament are reviewed, evaluated, and compared. Author (GRA)

N77-32721* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ANTHROPOMORPHIC MASTER/SLAVE MANIPULATOR SYSTEM Patent
Hubert C. Vykukal, Reginald F. King, and Wilbur C. Vallotton, inventors (to NASA) Issued 6 Sep. 1977 18 p Filed 24 Jan. 1974 Supersedes N74-16139 (12 - 07, p 0798)
(NASA-Case-ARC-10756-1; US-Patent-4,046,262; US-Patent-Appl-SN-436313; US-Patent-Class-214-1CM; US-Patent-Class-2-2.1A; US-Patent-Class-214-1BC) Avail: US Patent Office CSCL 05H

An anthropomorphic master/slave manipulator system including master arm apparatus with a plurality of master tubular articulated portions is outlined. Objectives of this investion were to provide a system that accurately and smoothly simulates human limb movement at a remote location. The system has a high frequency response, a high structural stiffness and a design that protects the components of the slave mechanism. Simulation of human movements is possible in outer space, underwater, and in a hazardous environment such as in a high radiation area. The equivalent ability, dexterity, and strength of a human arm are simulated. Official Gazette of the U.S. Patent Office

N77-32722* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
REGENERABLE DEVICE FOR SCRUBBING BREATHABLE AIR OF CO2 AND MOISTURE WITHOUT SPECIAL HEAT EXCHANGER EQUIPMENT Patent
Edward H. Tepper, inventor (to NASA) (Hamilton Standard, Windsor Lock, Conn.) Issued 6 Sep. 1977 8 p Filed 21 May 1976 Supersedes N76-26869 (14 - 17, p 2240) Sponsored by NASA
(NASA-Case-MSC-14771-1; US-Patent-4,046,529; US-Patent-Appl-SN-688854; US-Patent-Class-55-179; US-Patent-Class-55-269; US-Patent-Class-165-166) Avail: US Patent Office CSCL 06K

The device concerns the circulation of cabin air through canisters which absorb and adsorb carbon dioxide, together with excess moisture, and return the scrubbed air to the cabin for recirculation. A coating on an inert substrate in granular form absorbs and adsorbs the impurities at standard temperatures and pressures, but desorbs such impurities at low pressures (vacuum) and standard temperatures. This fact is exploited by making the device in a stack of cells consisting of layers or cells which are isolated from one another flow-wise and are connected to separate manifolds and valving systems into two separate subsets. A first subset may be connected for the flow breathable air therethrough until the polyethyleneimine of its cells is saturated with CO2 and H2O. During the same period the second subset of cells is manifolded to a vacuum source. Official Gazette of the U.S. Patent Office

N77-32723*# National Aeronautics and Space Administration. Pasadena Office, Calif.
COMPACT ARTIFICIAL HAND Patent Application
Gordon A. Wiker, inventor (to NASA) (JPL) and Wolfgang A. Mann Filed 27 Sep. 1977 13 p
(Contract NAS7-100)
(NASA-Case-NPO-13906-1; US-Patent-Appl-SN-837259) Avail: NTIS HC A02/MF A01 CSCL 06B

A compact and relatively simple artificial hand includes hooks pivotally mounted on a first frame to move together and apart. The first frame is rotatably mounted on a second frame to enable 'turning at the wrist' movements without limitation, and the second frame is pivotally mounted on a third frame to permit 'flexing at the wrist' movement. A hook-driving motor is fixed to the second frame but has a shaft that drives a speed reducer on the first frame which, in turn, drives the hooks. A second motor mounted on the second frame turns a gear on the first frame to rotate the first frame and the hooks thereon. A third motor mounted on the third frame, turns a gear on a second frame to pivot it. NASA

N77-32724# Army Construction Engineering Research Lab., Champaign, Ill.
CONCEPTS FOR THE GENERATION, COMMUNICATION, AND EVALUATION OF HABITABILITY CRITERIA Final Report
Roger L. Brauer and David L. Dressel Jun. 1977 36 p refs (AD-A041187; CERL-SR-D-78) Avail: NTIS HC A03/MF A01 CSCL 05/5

This report presents background information and concepts concerning the generation, evaluation, and communication of habitability criteria. Interactions between habitability criteria and facility delivery and use are discussed. The concepts presented form a basis for developing procedures relating personnel requirements to architectural requirements in the Army facility delivery and use process. Author GRA

N77-32725# Army Construction Engineering Research Lab., Champaign, Ill.
DEVELOPMENT OF AN OBJECTIVE DEFINITION OF HABITABILITY AND A HABITABILITY DATA BASE Final Report
Roger L. Brauer and Thomas A. Davis Jun. 1977 37 p refs (AD-A041188; CERL-SR-D-79) Avail: NTIS HC A03/MF A01 CSCL 05/5

This report summarizes the work performed in two areas: development of an objective definition of habitability and development of a habitability data base. Although it has been assumed that an absolute, objective definition of habitability cannot be reached because of the subject's dynamic nature, considerable progress has been made in developing a definition which provides a means for dealing systematically with habitability data. The prototype Habitability Data Base which has been developed provides a way of collecting, analyzing, storing, and retrieving such data. Recommendations for continuing development in both areas are also presented. Author (GRA)

N77-32726# Canyon Research Group, Inc., Westlake Village, Calif.
RESPONSE SURFACE METHODOLOGY REVISITED: A COMMENTARY ON RESEARCH STRATEGY Interim Scientific Report, Sep. 1975 - Sep. 1976
Charles W. Simon Jul. 1976 73 p refs
(Contract F44620-76-C-0008)
(AD-A043242; CWS-01-76; AFOSR-77-0973TR) Avail: NTIS HC A04/MF A01 CSCL 05/5

This paper reexamines five papers published in a special edition of Human Factors, August 1973, attempting to explain and illustrate the characteristics and applications of central-composite designs in the context of response-surface methodology. A detailed analysis is provided to show that the experimental papers (1) fail to illustrate the most important and useful features of response surface methodology designs as proposed by G.E.P. Box and his associates; (2) employ questionable procedures not specific to RSM that permit interpretations of results not considered by the investigators; and (3) do not constitute an experimental evaluation of the effectiveness of RSM central-composite designs as suggested by the investigators.
Author (GRA)

N77-32727# Human Engineering Labs., Aberdeen Proving Ground, Md.
COMPUTING INTERNAL COCKPIT REFLECTIONS OF EXTERNAL POINT-LIGHT SOURCES FOR THE MODEL 209 AH-1S HELICOPTER FLAT-PLATE CANOPY DESIGN Final Report
Christopher Smyth Jun. 1977 52 p refs
(AD-A043120; HEL-TM-20-77) Avail: NTIS HC A04/MF A01 CSCL 01/3

The US Army Human Engineering Laboratory (HEL) has developed a computer program for computing the internal cockpit reflections of external point light sources. Computations have been completed for the Model 209 AH-1S COBRA helicopter with the flat-plate canopy design. The results indicate that internal reflections are possible for a wide range of external source locations. A computer graphics output is included in the program to show the reflection points on a perspective drawing of the cockpit canopy as seen from the pilot's position. This report contains hard copies of such perspectives and describes the program and routines. Author (GRA)

N77-32728# Air Force Human Resources Lab., Brooks AFB, Tex.
ENGINEERING AND GEOGRAPHIC CONSTRAINTS OF A SIX DEGREE OF FREEDOM SYNERGISTIC PLATFORM MOTION SYSTEM Final Report
Michael L. Cyrus May 1977 14 p
(AF Proj. 1123)
(AD-A043194; AFHRL-TR-77-5) Avail: NTIS HC A02/MF A01 CSCL 14/2

Recent controversy surrounding the training effectiveness of the six degree of freedom, synergistic platform motion system is centered on several issues, one of which is, surprisingly, just exactly what motion the platform is capable of producing. This paper presents the primary equations and constraints, as well as a number of derived constraints applicable to the Advanced Simulator for Pilot Training (ASPT), a representative motion system. Author (GRA)

N77-32729# ENSCO, Inc., Springfield, Va.
EXPERIMENTAL DESIGNS AND PSYCHOMETRIC TECHNIQUES FOR THE STUDY OF RIDE QUALITY Final Report, Jul. 1974 - Jul. 1975
M. Dean Havron and Robert A. Westin May 1977 301 p refs
(Contract DOT-TSC-864)
(PB-268584/0; DOT-TSC-OST-76-54) Avail: NTIS HC A14/MF A01 CSCL 13F

Acceptable techniques for the development of methods for relating physical measures of vehicle vibration to passenger estimates of ride quality were studied, and recommendations for experimental design of vehicles are presented. GRA

N77-32730# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Physik der Atmosphaere.
RESULTS OF FIELD EXPERIMENTS CONCERNING VISIBILITY OF OBJECTS
H.-E. Hoffmann and R. H. Buell 15 Mar. 1977 34 p refs
(DLR-IB-553-77/3) Avail: NTIS HC A03/MF A01

During the last years the DFVLR, Institute of Atmospheric Physics, has conducted a number of field campaigns giving information about the visibility of objects. Observations were made in ground-to-air, air-to-ground, and ground-to-ground direction. Summaries of reports based on results of these experiments are given. Author (ESA)

N77-33780*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
BIOMEDICAL RESULTS FROM SKYLAB
Richard S. Johnston, ed. and Lawrence F. Dietlein, ed. Washington 1977 502 p refs Original contains color illustrations
(NASA-SP-377; LC-76-54287) Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Biomedical data from various experiments and observations reflect the physiological responses of spacecrews to prolonged space flight stress.

N77-33781*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SKYLAB MEDICAL PROGRAM OVERVIEW
Richard S. Johnson *In its* Biomed. Results from Skylab 1977 p 3-19 refs
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

The following major medical subsystems in Skylab are outlined: (1) operational equipment; (2) life science experiments; (3) medical operations; and (4) operational experience. Throughout the Skylab flight program, alterations in equipment and procedures were made for each succeeding mission to capitalize on the flight experience of the previous mission. G.G.

N77-33782*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
FLIGHT CONTROL EXPERIENCES
F. Story Musgrave *In its* Biomed. Results from Skylab 1977 p 20-21
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 05H

A multidisciplinary medical-management team at mission control provided Skylab crew support by monitoring health, retrieving and compiling experimental data, assisting in the development of flight plans, and by contributing to in-flight procedures and checklists. Real time computers assisted the flight crews in performing medical and other experiments. G.G.

N77-33783*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SKYLAB 4 CREW OBSERVATIONS
Edward G. Gibson *In its* Biomed. Results from Skylab 1977 p 22-26
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Comments on food, exercise, scheduling, medical training, the effect of fluid shift, and vestibular phenomena are briefly reported. A ballistocardiographic effect of around 60 beats per minute was observed several times for the whole Skylab cluster. Also experienced were light flashes that were well correlated with the South Atlantic anomaly. G.G.

N77-33784*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SKYLAB 2 CREW OBSERVATIONS AND SUMMARY
Joseph P. Kerwin *In its* Biomed. Results from Skylab 1977 p 27-29
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06S

Signs and symptoms experienced during weightlessness ranged from a sensation of fullness in the head to a strange body posture and the sensation of fluid drainage out of the legs. There was no vestibular sense of the upright whatsover unless the crewmember happened to look at the earth; motion sickness was not a clinical problem. The ability to maintain physical

fitness through exercise and the caloric demand remained just about the same as they do on the ground after initial adjustment. G.G.

N77-33785*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SKYLAB CREW HEALTH: CREW SURGEON'S REPORT

Jerry R. Hordinsky *In its* Biomed. Results from Skylab 1977 p 30-34 ref
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Medical examinations and treatment of crewmen preflight, during Skylab missions, and postflight periods are outlined. From a clinical point of view, all of the physiological responses noted in the various missions were either self-limiting or represented work-around problems requiring minimal counteraction. As such, these changes do not preclude extending man's duration in zero-gravity for longer periods of time. G.G.

N77-33786*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SKYLAB ORAL HEALTH STUDIES
Lee R. Brown (Tex. Univ., Houston), William J. Frome, Sandra Handler (Tex. Univ., Houston), Merrill G. Wheatcroft (Tex. Univ., Houston), and Linda J. Rider (Tex. Univ., Houston) *In its* Biomed. Results from Skylab 1977 p 35-44 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06E

Evaluation of Skylab crewmembers for mission related effects on oral health in relation to possible dental injuries provided the following distinctive changes: (1) increased counts of specific anaerobic and streptococcal components; (2) elevations in levels of secretory IgA concurrent with diminutions of salivary lysozyme; and (3) increases in dental calculus and gingival inflammations. The clinical changes are considered to be more influenced by the preexisting state of dental health than by any mission related effects. G.G.

N77-33787*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ANALYSIS OF THE SKYLAB FLIGHT CREW HEALTH STABILIZATION PROGRAM
J. Kelton Ferguson, Gary W. McCollum (Public Health Service, Atlanta), and Benjamin L. Portnoy *In its* Biomed. Results from Skylab 1977 p 45-52 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06E

Isolation periods were established prior to launch as well as postflight in order to reduce the number of infectious illness contacts between crewmen. The most frequently reported illness contacts were upper respiratory infections. Enteric illnesses represented the next most common illness, but these were relatively rare compared to upper respiratory infections. G.G.

N77-33788*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SKYLAB ENVIRONMENTAL AND CREW MICROBIOLOGY STUDIES
Gerald R. Taylor, Richard C. Graves, Royce M. Brockett (School of Aerospace Med.), J. Kelton Ferguson, and Ben J. Mieszkuc *In its* Biomed. Results from Skylab 1977 p 53-63 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

Microbial flora samples were collected from crewmembers before, during, and after missions in order to obtain data on the microbial response to space flight environment. Data showed that, while gross contamination of the Skylab environment was demonstrated and there were several in-flight disease events, such events are not limiting hazards for long term manned space flights. Intercrew transfer of pathogens was demonstrated, but evidence of postflight microbial shock was not found. G.G.

N77-33789*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
RADIOLOGICAL PROTECTION AND MEDICAL DOSIMETRY FOR THE SKYLAB CREWMEN
J. Vernon Bailey, Rudolf A. Hoffman, and Robert A. English *In its* Biomed. Results from Skylab 1977 p 64-69 refs

Avail: NTIS CSCL 06R

Dosimetry results for Skylab crewmembers show that the Skylab 4 crewmen received the highest dose equivalents but remained well within the established limits for Skylab missions below the threshold of significant clinical effects. These dose equivalents apply specificially to long term effects such as general life shortening, increased neoplasm incidence, and cataract production. A Skylab crewman could fly a mission comparable to one 84-day Skylab 4 mission per year for 50 years before exceeding these career limits. G.G.

N77-33790*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
TOXICOLOGICAL ASPECTS OF THE SKYLAB PROGRAM

Wayland J. Rippstein, Jr. and Howard J. Schneider *In its* Biomed. Results from Skylab 1977 p 70-72 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06T

A current state-of-the-art trace gas removal technology is demonstrated that provides for carbon monoxide removal through an outgassing screening program for nonmetallic materials of the Skylab cabin interior. Material selection included both outgassing data and LD sub 50 information, as well as chemical analyses on pyrolysis products to prevent toxic inhalation exposures of spacecrews. G.G.

N77-33791*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
EXPERIMENT M131. HUMAN VESTIBULAR FUNCTION

Ashton Graybiel (Naval Aerospace Med. Res. Lab., Pensacola, Fla.), Earl F. Miller, II (Naval Aerospace Med. Res. Lab., Pensacola, Fla.), and Jerry L. Homick *In its* Biomed. Results from Skylab 1977 p 74-103 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

The lower susceptibility to vestibular stimulation aloft, compared with that on ground under experimental conditions, is attributed to a precondition, namely, either there is no need to adapt, or, as exemplified by the Skylab 3 pilot, adaptation to weightlessness is achieved. Findings in some of the astronauts emphasize the distinction between two categories of vestibular side effects: immediate reflex phenomena (illusions, sensations of turning, etc.), and delayed epiphenomena that include the constellation of symptoms and syndromes comprising motion sickness. The drug combinations 1-scopolamine and d-amphetamine and promethazine hydrochloride and ephedrine sulfate are effective in prevention and treatment of motion sickness. It is concluded that prevention of motion sickness in any stressful motion environment involves selection, adaptation, and the use of drugs. Author

N77-33792*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THE EFFECTS OF PROLONGED EXPOSURE TO WEIGHTLESSNESS ON POSTURAL EQUILIBRIUM
Jerry L. Homick, Millard F. Reschke, and Earl F. Miller, II *In its* Biomed. Results from Skylab 1977 p 104-112 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06S

A postflight postural equilibrium rail test on spacecrews was used to prove a pronounced decrement in ability to maintain an upright posture after prolonged exposure to weightlessness. Support for the hypothesis that central neural reorganization occurs

in response to environmental change is obtained when postflight decrease in stability on the rails and the time course for recovery are compared with preflight performance. G.G.

N77-33793*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
EXPERIMENT M133. SLEEP MONITORING ON SKYLAB

James D. Frost, Jr. (Baylor Coll. of Med.), William H. Schumate, Joseph G. Salamy (Technol., Inc., Houston), and Cletis R. Booher *In its* Biomed. Results from Skylab 1977 p 113-126 refs (For primary document see N77-33780 24-51)
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Subjective sleep logs during 59-day and 84-day Skylab missions indicate that prolonged space flight, with its accompanying weightless state, is not directly associated with major adverse changes in sleep characteristics. Observed alterations in sleep patterns were not of sufficient magnitude to result in significant degradation of performance capacity. Author

N77-33794*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
VISUAL LIGHT FLASH OBSERVATIONS ON SKYLAB 4

Rudolf A. Hoffman, Lawrence S. Pinsky (Houston Univ.), W. Zach Osborne (Houston Univ.), and J. Vernon Bailey *In its* Biomed. Results from Skylab 1977 p 127-130 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Evaluation of light flashes observed in earth orbit establishes: (1) a strong correlation of very high flash rates with passage through the South Atlantic anomaly; (2) evidence for a predicted latitude effect; and (3) an increased flash rate outside the anomaly during a second observation period. Event rates and flash descriptions during South Atlantic anomaly passes indicate that there may be particles heavier than protons in the inner belt of trapped radiation. G.G.

N77-33795*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CHANGES IN THE ACHILLES TENDON REFLEXES FOLLOWING SKYLAB MISSIONS
Joseph T. Baker (Technol., Inc., Houston), Arnauld E. Nicogossian, G. Wyckliffe Hoffler, Robert L. Johnson, and J. R. Hordinsky *In its* Biomed. Results from Skylab 1977 p 131-135 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Postflight measurements of Achilles tendon reflex duration on Skylab crewmen indicate a state of disequilibrium between the flexor and extensor muscle groups with an initial decrease in reflex duration. As the muscles regain strength and mass there occurs an overcompensation reflected by increased reflex duration. Finally, when a normal neuromuscular state is reached the reflex duration returns to baseline value. G.G.

N77-33796*# Fordham Univ., New York.
TASK AND WORK PERFORMANCE ON SKYLAB MISSIONS 2, 3, AND 4: TIME AND MOTION STUDY: EXPERIMENT M151
Joseph F. Kubis, Edward J. McLaughlin (Tex. Univ., Houston), Janice M. Jackson, Rudolph Rusnak, Gary H. McBride, and Susan V. Saxon *In* NASA. JSC Biomed. Results from Skylab 1977 p 136-154 ref
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 05H

Human task performance was evaluated under weightlessness conditions during long duration space flight in order to study the characteristics of the adaptation function. Results show that despite pronounced variability in training schedules and in initial reaction to the Skylab environment, in-flight task performance was relatively equivalent among Skylab crews, and behavioral performance continued to improve from beginning to end of all missions. G.G.

N77-33797*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CREW EFFICIENCY ON FIRST EXPOSURE TO ZERO-GRAVITY
Owen K. Garriott and Gary L. Doerre *In its* Biomed Results from Skylab 1977 p 155-162 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06S

Activation task performance of Skylab crews showed improved efficiency as experience was gained in weightlessness living. During three activation intervals, less than 12 man-hours were lost due to reduced efficiency (including the effects of motion sensitivity) while almost 200 man-hours of productive work were delivered. Work rate improved for tasks in which simulation and training time were extensive and for tasks which allowed zero-gravity operations to be optimized. G.G.

N77-33798*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
MINERAL AND NITROGEN METABOLIC STUDIES, EXPERIMENT M071
G. Donald Whedon (Natl. Inst. of Health), Leo Lutwak (Calif. Univ., Los Angeles), Paul C. Rambaut, Michael W. Whittle, Malcolm C. Smith, Jr., Jeanne Reid (Natl. Inst. of Health), Carolyn S. Leach, Connie Rae Stadler (Technol., Inc., Houston), and Deanna D. Sanford (Technol., Inc., Houston) *In its* Biomed. Results from Skylab 1977 p 164-174 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

The similarity between bed rest test and space flight effects on human mineral and nitrogen metabolisms indicates impairment of capable musculoskeletal functions. A pattern of urinary calcium increases and total calcium shifts suggests that calcium losses continue with time. Significant losses of nitrogen and phosphorus are associated with reduction in muscle tissue. It is concluded that capable musculoskeletal function is likely to be impaired during space flights of 1 1/2 to 3 years duration. G.G.

N77-33799*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
PHYSIOLOGICAL MASS MEASUREMENTS IN SKYLAB

William E. Thornton and John Ord (Dept. of the AF, Scott AFB, Ill.) *In its* Biomed. Results from Skylab 1977 p 175-182

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

A spring-mass oscillator constrained to linear motion was used to measure astronaut weight during Skylab mission. Plots of spacecrew body weights, preflight and postflight, and inflight equivalent weight measurements indicate high in-flight metabolic costs with weight losses under weightlessness conditions. G.G.

N77-33800*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
BONE MINERAL MEASUREMENT: EXPERIMENT M078

Malcolm C. Smith, Jr., Paul C. Rambaut, John M. Vogel (Calif. Univ., Davis), and Michael W. Whittle *In its* Biomed. Results from Skylab 1977 p 183-190 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Gamma ray absorptiometric measurements on bone mineral content, in addition to calcium balance studies, were performed on male volunteers during bed rest periods of 24 to 36 weeks duration and compared to Skylab mission data. Results show that mineral losses occur from the bones of the lower extremities

during missions of up to 84 days and that in general they follow the loss patterns of the bed rest situation. The level of loss observed in Spacelab crews is not of clinical concern.G.G.

N77-33801*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
MUSCULAR DECONDITIONING AND ITS PREVENTION IN SPACE FLIGHT
William E. Thornton and John A. Rummel *In its* Biomed. Results from Skylab 1977 p 191-197 ref

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Exercise and exercise devices on Skylab missions prevented muscle loss in spacecrews. It is concluded that muscle in space is no different from muscle on earth; if it is properly nourished and exercised at reasonable load levels, it maintains its function under weightlessness conditions. G.G.

N77-33802*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
BIOSTEREOMETRIC ANALYSIS OF BODY FORM
Michael W. Whittle, Robin Herron (Tex. Inst. for Rehabil. and Res.), and Jaime Cuzzi *In its* Biomed. Results from Skylab 1977 p 198-202 refs

Avail: NTIS MF A01; SOD HC as 033-00648-9 CSCL 06P

Four-camera stereophotogrammetry of Skylab crewmen, preflight and postflight, revealed a loss of volume of one to one and one-half liters from the legs, much of which was replaced during the first 4 postflight days. It is estimated that about one third of the loss represents partial atrophy due to relative disuse in zero-gravity, the remainder being due to a deficit in body fluid. Reduction in volume of the abdomen has also been noted. Author

N77-33803*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
BIOCHEMICAL RESPONSES OF THE SKYLAB CREWMEN: AN OVERVIEW
Carolyn S. Leach and Paul C. Rambaut *In its* Biomed. Results from Skylab. 1977 p 204-216 refs

Avail: NTIS MF A01; SOD HC as 033-00648-9 CSCL 06P

Continuous metabolic and endocrinic monitoring of Skylab crewmen established significant biochemical changes that varied in magnitude and direction but disappeared shortly after return to earth. These changes indicate adaptation by the body to the combined stresses of weightlessness. Transient changes in fluid and electrolyte metabolisms lead to the conclusion that a homeostasis condition had been achieved. Unstable states persisted in the metabolisms of bone mineral, protein, and carbohydrates. G.G.

N77-33804*# Texas Univ., Galveston. Medical Branch.
CYTOGENETIC STUDIES OF BLOOD, EXPERIMENT M111
Lillian H. Lockhart *In* NASA. JSC Biomed. Results from Skylab 1977 p 217-220 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Analysis of the chromosome patterns of Skylab crewmen preflight and postflight recorded two types of defects: minor structural defects including chromatid breaks, chromosome breaks, deletions, and fragments were not significantly increased; structural rearrangements including dicentrics, exchange figures, inversions, and translocations occured more frequently. Data indicate that the flight itself in Skylab missions was not a contributing factor to these abberrations. G.G.

N77-33805*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THE RESPONSE OF SINGLE HUMAN CELLS TO ZERO-GRAVITY
P. OB. Montgomery, Jr. (Dallas County Hosp. District), J. E. Cook (Dallas County Hosp. District), R. C. Reynolds (Tex. Univ., Dallas), J. S. Paul (Dallas County Hosp. District), L. Hayflick, D. Stock (Tex. Univ., Houston), W. W. Shulz (Dallas County Hosp. District), S. L. Kimzey, R. G. Thirolf, T. Rogers et al *In its* Biomed. Results from Skylab 1977 p 221-234 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06S

Microscopic and histochemical evaluations of human embrionic lung cells after exposure to zero-gravity are reported. Growth curves, DNA microspectrophotometry, phase microscopy, and ultrastructural studies of fixed cells revealed no effects on the cultures. Minor unexplained differences have been found in biochemical constituents of the samples. G.G.

N77-33806*# Baylor Univ., Houston, Tex. Coll. of Medicine.
BLOOD VOLUME CHANGES
Philip C. Johnson, Theda B. Driscoll, and Adrian D. LeBlanc *In* NASA. JSC Biomed. Results from Skylab 1977 p 235-241 refs
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Red cell mass measurements on Skylab crewmembers revealed a statistically significant decrease in circulating red cells. Low reticulocyte counts at crewmember recovery indicated increased splenic removal of reticulum or decreased bone marrow production rates. After the initial loss there is at least a 30-day delay before red cell mass begins to reconstitute itself G.G.

N77-33807*# Missouri Univ., Columbia.
RED CELL METABOLISM STUDIES ON SKYLAB
Charles E. Mengel *In* NASA. JSC Biomed. Results from Skylab 1977 p 242-248 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Blood samples from Spacelab crewmembers were studied for possible environment effects on red cell components. Analysis involved peroxidation of red cell lipids, enzymes of red cell metabolism, and levels of 2,3-diphosphoglyceric acid and adenosine triphosphate. Results show that there is no evidence of lipid peroxidation, that biochemical effect known to be associated with irreversible red cell damage. Changes observed in glycolytic intermediates and enzymes cannot be directly implicated as indicating evidence of red cell damage. G.G.

N77-33808*# National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.
HEMATOLOGY AND IMMUNOLOGY STUDIES
Stephen L. Kimzey *In its* Biomed. Results from Skylab 1977 p 249-282 refs
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06E

A coordinated series of experiments were conducted to evaluate immunologic and hemotologic system responses of Skylab crewmen to prolonged space flights. A reduced PHA responsiveness was observed on recovery, together with a reduced number of T-cells, with both values returning to normal 3 to 5 days postflight. Subnormal red cell count, hemoglobin concentration, and hematocrit values also returned gradually to preflight limits. Most pronounced changes were found in the shape of red blood cells during extended space missions with a rapid reversal of these changes upon reentry into a normal gravitational environment. G.G.

N77-33809*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
LOWER BODY NEGATIVE PRESSURE: THIRD MANNED SKYLAB MISSION
Robert L. Johnson, G. Wykliffe Hoffler, Arnauld E. Nicogossian, Stuart A. Bergman, Jr., and Margaret M. Jackson *In its* Biomed. Results from Skylab 1977 p 284-312 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06S

The objective of the Skylab Lower Body Negative Pressure experiment was to determine the extent and the time course of changes in orthostatic tolerance during the weightlessness of space flight and to determine whether in-flight data from the experiment would be useful in predicting the postflight status of orthostatic tolerance. Compared to preflight results, lower body negative pressure produced exaggerated blood pressure and heart rate responses during the first in-flight test of the Skylab 2 crewmen and showed no clear-cut trend toward preflight levels during the 28-day flight. During the second manned mission, Skylab 3, similar exaggeration of blood pressure and heart rate responses occurred during the first in-flight test. Again no definite trend toward preflight values could be seen during the first 28 days but cardiovascular responses to lower body negative pressure appeared to become more stable by the sixth to eighth week of flight. In general, the test results in-flight served to predict quite well the orthostatic tolerance of the individual crewmen in the immediate postflight period. Author

N77-33810*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

VECTORCARDIOGRAPHIC RESULTS FROM SKYLAB MEDICAL EXPERIMENT M092: LOWER BODY NEGATIVE PRESSURE

G. Wylkliffe Hoffler, Robert L. Johnson, Arnauld E. Nicogossian, Stuart A. Bergman, Jr., and Margaret M. Jackson *In its* Biomed. Results from Skylab 1977 p 313-323 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Electrocardiographic interval changes suggesting effects of increased vagal tone were observed early in some Gemini crewmembers. Preflight versus postflight amplitude differences appeared in electrocardiograms of several of the early Apollo crewmembers. In preflight and postflight crew evaluations of the last three Apollo flights, quantitative postflight vectorcardiographic changes were for the first time determined in American space crews. Changes not considered related to heart rate were mainly those of increased P and QRS vector magnitudes and orientation shifts. But since most of these postflight findings resembled those observed with the orthostatic stress of lower body negative pressure, it was inferred then that upon their return from space, these Apollo astronauts exhibited exaggerated responses to orthostasis in the vectorcardiogram as well as in measures of cardiovascular hemodynamics. Author

N77-33811*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

HEMODYNAMIC STUDIES OF THE LEGS UNDER WEIGHTLESSNESS

William E. Thornton and G. Wylkliffe Hoffler *In its* Biomed. Results from Skylab 1977 p 324-329

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06S

Significant among the medical findings following prolonged space flight are reduced orthostatic tolerance and ergometric work capacity. Changes in hemodynamics of the legs with increased blood pooling and reduction in cardiac output must be considered one of the most probable causes of these effects. Concern for the above plus the observed marked tissue changes occurring in the legs during flight prompted the addition of several procedures to evaluate hemodynamic changes in the leg: resting arterial blood flow, venous compliance and muscle pumping were investigated. In so far as possible, the initial reaction to pressure in the smallest possible vein segment was examined. Author

N77-33812*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

ANTHROPOMETRIC CHANGES AND FLUID SHIFTS

William E. Thorton, G. Wyckliffe Hoffler, and John A. Rummel *In its* Biomed. Results from Skylab 1977 p 330-338

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06S

In an effort to obtain the most comprehensive and coherent picture of changes under weightlessness, a set of measurements on Skylab 2 was initiated and at every opportunity, additional studies were added. All pertinent information from ancillary sources were gleaned and collated. On Skylab 2, the initial anthropometric studies were scheduled in conjunction with muscle study. A single set of facial photographs was made in-flight. Additional measurements were made on Skylab 3, with photographs and truncal and limb girth measurements in-flight. Prior to Skylab 4, it was felt there was considerable evidence for large and rapid fluid shifts, so a series of in-flight volume and center of mass measurements and infrared photographs were scheduled to be conducted in the Skylab 4 mission. A number of changes were properly documented for the first time, most important of which were the fluid shifts. The following description of Skylab anthropometrics address work done on Skylab 4 primarily. Author

N77-33813*# Vanderbilt Univ., Nashville, Tenn.

VECTORCARDIOGRAPHIC CHANGES DURING EXTENDED SPACE FLIGHT (M093): OBSERVATIONS AT REST AND DURING EXERCISE

Raphael F. Smith, Kevin Stanton (Naval Aerospace Med. Inst., Pensacola, Fla.,), David Stoop (Naval Aerospace Med. Inst., Pensacola, Fla.), Donald Brown (Naval Aerospace Med. Inst., Pensacola, Fla.), Walter Janusz, and Paul King *In* NASA. JSC Biomed. Results from Skylab 1977 p 339-350 refs

Avail: NTIS HC A02/MF A01 CSCL 06S

The objectives of Skylab Experiment M093 were to measure electrocardiographic signals during space flight, to elucidate the electrophysiological basis for the changes observed, and to assess the effect of the change on the human cardiovascular system. Vectorcardiographic methods were used to quantitate changes, standardize data collection, and to facilitate reduction and statistical analysis of data. Since the Skylab missions provided a unique opportunity to study the effects of prolonged weightlessness on human subjects, an effort was made to construct a data base that contained measurements taken with precision and in adequate number to enable conclusions to be made with a high degree of confidence. Standardized exercise loads were incorporated into the experiment protocol to increase the sensitivity of the electrocardiogram for effects of deconditioning and to detect susceptability for arrhythmias. Author

N77-33814# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

EVALUATION OF THE ELECTROMECHANICAL PROPERTIES OF THE CARDIOVASCULAR SYSTEM AFTER PROLONGED WEIGHTLESSNESS

Stuart A. Bergman, Jr., Robert L. Johnson, and G. Wyckliffe Hoffler *In its* Biomed. Results from Skylab 1977 p 351-365 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Devices and techniques for measuring and analyzing systolic time intervals and quantitative phonocardiograms were initiated during Apollo 17. The data show that the systolic time interval from Apollo 17 crewmen remained elevated longer postflight than the response criteria of heart rate, blood pressure, and percent change in leg volume all of which had returned to preflight levels by the second day postflight. Although the systolic time interval values were only slightly outside the preflight fiducial limits, this finding suggested that: the analysis of systolic time intervals may help to identify the mechanisms of postflight orthostatic intolerance by virtue of measuring ventricular function more directly and the noninvasive technique may prove useful in determining the extent and duration of cardiovascular instability after long duration space flight. The systolic time intervals obtained on the Apollo 17 crewmen during lower body negative pressure were similar to those noted in patients with significant heart disease. Author

N77-33815*# National Institutes of Health, Bethesda, Md.

EFFECT OF PROLONGED SPACE FLIGHT ON CARDIAC FUNCTION AND DIMENSIONS

Walter L. Henry, Stephen E. Epstein, James M. Griffith, Robert E. Goldstein, and David R. Redwood *In* NASA., JSC Biomed. Results from Skylab 1977 p 366-371 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06S

By taking advantage of the capabilities of echocardiography to measure noninvasively left ventricular volume, stroke volume, and ejection fraction, and of the fact that the astronauts were routinely subjected to lower body negative pressure (whereby cardiac filling is progressively decreased), it was possible to construct classic ventricular function curves noninvasively, thereby obviating the difficulties encountered in comparing cardiac function at different end-diastolic volumes preflight and postflight. In this manner, the effect of an 84-day period of weightlessness on cardiac structure and function was evaluated in the Skylab 4 astronauts. Author

N77-33816*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

RESULTS OF SKYLAB MEDICAL EXPERIMENT M171-METABOLIC ACTIVITY

Edward L. Michel, John A. Rummel, Charles F. Sawin, Melvin C. Buderer (Life Sciences Div. Technol. Inc., Houston, Tex.), and John D. Lem *In its* Biomed. Results from Skylab 1977 p 372-387 refs

Avail: NTIS MF A01; SOD HC as 003-000-00648-9 CSCL 06P

The primary objective of the experiment was to determine whether man's metabolic effectiveness while performing mechanical work was progressively altered by exposure to the space environment. The secondary objective was to evaluate the M171 bicycle ergometer as an in-flight crew personal exerciser. This manuscript is the report of the third (Skylab 4) manned mission and a summary of what was learned from all three Skylab manned missions about the physiological response to exercise during and after periods of 28 days, 59 days, and 84 days of weightlessness, respectively. Author

N77-33817*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

PULMONARY FUNCTION EVALUATION DURING AND FOLLOWING SKYLAB SPACE FLIGHTS

Charles F. Sawin, Arnauld E. Nicogossian, A. Paul Schachter (Technol. Inc., Houston, Tex.), John A. Rummel, and Edward L. Michel *In its* Biomed. Results from Skylab 1977 p 388-394 refs

Avail: NTIS MF A01; SOD HC as 003-000-00648-9 CSCL 06P

Cardiac output measurements were made in the laboratory during preflight and postflight exercise tests. Due to the magnitude of decreases in cardiac output following the first and second manned Skylab missions and because the method used is based upon normal pulmonary function, it was decided to perform more thorough pulmonary function screening in conjunction with the final and longest duration Skylab mission. This paper summarized pulmonary function data obtained during all three Skylab missions. Author

N77-33818*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

METABOLIC COST OF EXTRAVEHICULAR ACTIVITIES

James M. Waligora and David J. Horrigan, Jr. *In its* Biomed. Results from Skylab 1977 p 395-399 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

The Skylab zero-g extravehicular activity data is of particular interest when it is considered in combination with the Apollo and Gemini data. The energy cost of extravehicular activity from Gemini through Skylab is discussed. Author

N77-33819*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

DETERMINATION OF CARDIAC SIZE FROM CHEST ROENTGENOGRAMS FOLLOWING SKYLAB MISSIONS

Arnauld E. Nicogossian, G. Wyckliffe Hoffler, Robert L. Johnson (USAF Academy, Colorado Springs, Colo.), and Richard J. Gowen *In its* Biomed. Results from Skylab 1977 p 400-405 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

The majority of crewmembers who exhibited postflight decreases in the cardiac silhouette size also showed a decreased orthostatic tolerance to lower body negative pressure. Similar findings were also reported by the Soviet investigators following 30-day bedrest studies and in cosmonauts upon return from space missions. Further radiological data from all three Skylab manned missions are presented and the physiological factors possibly involved in the cardiac silhouette changes are discussed. Author

N77-33821*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

LOWER BODY NEGATIVE PRESSURE DEVICE

Robert W. Nolte *In its* Biomed. Results from Skylab 1977 p 421-423 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The Lower Body Negative Pressure Device was used, in the space environment, to stress the astronaut's cardiovascular system, to determine the extent and time course of his cardiovascular deconditioning and to determine whether in-flight data from experiment M092, Lower Body Negative Pressure, would be useful in predicting postflight status of orthostatic tolerance. The lower portion of the subject's body was enclosed in this device for the purpose of applying regulated and controlled negative pressure. A description is given of the device. Author

N77-33822*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

AUTOMATIC BLOOD PRESSURE MEASURING SYSTEM

Robert W. Nolte *In its* Biomed. Results from Skylab 1977 p 424-427 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The Leg Volume Measuring System is used to measure leg calf girth changes that occur during exposure to lower body negative pressure as a result of pooling of blood and other fluids in the lower extremities. Author

N77-33823*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

AUTOMATIC BLOOD PRESSURE MEASURING SYSTEM

Robert W. Nolte *In its* Biomed. Results from Skylab 1977 p 428-432 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The Blood Pressure Measuring System is described. It measures blood pressure by the noninvasive Korotkoff sound technique on a continual basis as physical stress is imposed during experiment M092, Lower Body Negative Pressure, and experiment M171, Metabolic Activity. Author

N77-33824*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

VECTORCARDIOGRAPH

John Lintott and Martin J. Costello (Martin Marietta Aerospace, Denver, Colo.) *In its* Biomed. Results from Skylab 1977 p 441-444 ref

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

A system for quantitating the cardiac electrical activity of Skylab crewmen was required for three medical experiments (M092, Lower Body Negative Pressure; M171, Metabolic Activity; and M093, In-flight Vectorcardiogram) designed to evaluate the effects of space flight on the human cardiovascular system. A Frank lead vectorcardiograph system was chosen for this task because of its general acceptability in the scientific community and its data quantification capabilities. To be used effectively in space flight, however, the system had to meet certain other requirements. The system was required to meet the specifications recommended by the American Heart Association. The vectorcardiograph had to withstand the extreme conditions of the space environment. The system had to provide features that permitted ease of use in the orbital environment. The vectorcardiograph system performed its intended function throughout all the Skylab missions without a failure. A description of this system follows. Author

N77-33825*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
A.I.e. IN-FLIGHT BLOOD COLLECTION SYSTEM
John M. Hank *In its* Biomed. Results from Skylab 1977 p 433-435
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The hardware selected to obtain and partially process human blood samples during the Skylab missions is described and consists of the following three major items: a centrifuge, an evacuation regulator, and a Beta cloth bag. Author

N77-33826*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ERGOMETER
John D. Lem *In its* Biomed. Results from Skylab 1977 p 436-440
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The bicycle ergometer was designed for use in experiments M171 and M093 and for use in optional exercise by the crewmen. The ergometer allows a crewman to exercise in zero-gravity using either his hands or his feet. It provides a precisely calibrated and, if needed, a programmable standard of work rate for the crewman. The ergometer operates in any of three selectable modes. The set heart rate mode varies the ergometer work rate, as necessary, to achieve and maintain a preselected heart rate. The sequenced heart rate mode is similar to the set heart rate mode except that the heart rate is programmable through five preset levels with a period of time for each level. The set work rate mode delivers a preset work load to the subject. Author

N77-33827*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
METABOLIC ANALYZER
John D. Lem *In its* Biomed. Results from Skylab 1977 p 445-447
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The metabolic analyzer was designed to support experiment M171. It operates on the so-called open circuit method to measure a subject's metabolic activity in terms of oxygen consumed, carbon dioxide produced, minute volume, respiratory exchange ratio, and tidal volume or vital capacity. The system operates in either of two modes. (1) In Mode I, inhaled respiratory volumes are actually measured by a piston spirometer. (2) In Mode II, inhaled volumes are calculated from the exhaled volume and the measured inhaled and exhaled nitrogen concentrations. This second mode was the prime mode for Skylab. Following is a brief description of the various subsystems and their operation. Author

N77-33828*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
BODY TEMPERATURE MEASURING SYSTEM (M171)
John D. Lem *In its* Biomed. Results from Skylab 1977 p 448-449
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The body temperature probe is used in support of experiment M171 to determine if crewmen are storing heat following exercise and to monitor crew health in case of illness. Author

N77-33829*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
HARDWARE REPORT FOR EXPERIMENT M133, SLEEP MONITORING ON SKYLAB
Cletis R. Booher and E. Fontaine LaRue (Martin Marietta Aerospace, Denver) *In its* Biomed. Results from Skylab 1977 p 450-454
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The purpose of the experiment was objectively to measure sleep quantity and quality during prolonged space flight with the use of automatic equipment for onboard analyses of electroencephalographic (EEG) and electro-oculographic (EOG) activity and telemetry of sleep stage data. Author

N77-33830*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SKYLAB EXPERIMENT M131: ROTATING LITTLE CHAIR

James S. Evans, Dennis L. Zitterkopf (Johns Hopkins Univ., Silver Spring, Md.), Robert L. Konigsberg (Johns Hopkins Univ., Silver Spring, Md.), and Charles M. Blackburn (Johns Hopkins Univ., Silver Spring, Md.) *In its* Biomed. Results from Skylab 1977 p 455-458
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

Physiological considerations suggest that the response of the vestibular system can be substantially modified during weightlessness and that such modifications affect susceptibility to motion sickness and to judgment of spatial localization. Evaluation of such effects requires measurement of responses to rotational accelerations before, during, and after exposure to conditions of prolonged zero-gravity. For this purpose, a precisely controlled rotating chair was designed, constructed, tested, and installed in the Skylab Orbital Workshop. The chair was used in three test modes to measure changes in the vestibular (balance) organs of the astronauts. Author

N77-33831*# National Aeronautics and Space Administration Lyndon B. Johnson Space Center, Houston, Tex.
EXPERIMENT SUPPORT SYSTEM
Albert V. Shannon *In its* Biomed. Results from Skylab 1977 p 459-462
Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The Experiment Support System is a switchboard system with displays and controls. It routes electrical power to experiments M092, M093, and M171 equipment; gaseous nitrogen to the Blood Pressure Measurement System; receives biomedical data from all related equipment; routes the conditioned data signals to the Airlock Module Telemetry System and also displays (in digital or analog from) portions of that data which the crewmen must see to complete the experiment successfully. The Experiment Support System is interfaced to the M131 control panel to transfer conditioned data to the Airlock Module Telemetry System. Author

N77-33832*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
IN-FLIGHT MEDICAL SUPPORT SYSTEM

Charles Chassay and Sylvia A. Rose (Boeing Co., Houston) *In its* Biomed. Results from Skylab 1977 p 463-473 refs

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The In-flight Medical Support System for Skylab was designed to provide the onboard Crew Physician or Scientist Pilot (or other crewmember if the Scientist Pilot was unable to act) with information adequate to make diagnostic assessment of those injuries or illnesses most likely to occur in the Skylab environment. The necessary diagnostic, therapeutic, and laboratory equipment needed to diagnose and to render first aid, resuscitative or supportive measures was stored in the Skylab Orbital Workshop. The resupply kit containing refrigerated laboratory and drug resupply items was stored in the Command Module. Author

N77-33833*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

CARBON DIOXIDE/DEWPOINT MONITOR

Stanley Luczkowski *In its* Biomed. Results from Skylab 1977 p 474-477

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The portable Carbon Dioxide/Dewpoint Monitor was designed to permit measurements of carbon dioxide partial pressure and dewpoint and ambient gas temperature at any place within the Saturn Workshop. It required no vehicle interface other than storage. All components necessary for operation, including battery power source, were incorporated in the instrument. Author

N77-33834*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

ATMOSPHERIC ANALYZER, CARBON MONOXIDE MONITOR AND TOLUENE DIISOCYANATE MONITOR

Albert V. Shannon *In its* Biomed. Results from Skylab 1977 p 478-480

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The purpose of the atmospheric analyzer and the carbon monoxide and toluene diisocyanate monitors is to analyze the atmospheric volatiles and to monitor carbon monoxide and toluene diisocyanate levels in the cabin atmosphere of Skylab. The carbon monoxide monitor was used on Skylab 2, 3, and 4 to detect any carbon monoxide levels above 25 ppm. Air samples were taken once each week. The toluene diisocyanate monitor was used only on Skylab 2. The loss of a micrometeoroid shield following the launch of Skylab 1 resulted in overheating of the interior walls of the Orbital Workshop. A potential hazard existed from outgassing of an isocyanate derivative resulting from heat-decomposition of the rigid polyurethane wall insulation. The toluene diisocyanate monitor was used to detect any polymer decomposition. The atmospheric analyzer was used on Skylab 4 because of a suspected leak in the Skylab cabin. An air sample was taken at the beginning, middle, and the end of the mission. Author

N77-33835*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

SKYLAB HARDWARE REPORT OPERATIONAL BIOINSTRUMENTATION SYSTEM

Stanley Luczkowski *In its* Biomed. Results from Skylab 1977 p 481-484 ref

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The Skylab Operational Bioinstrumentation System is a personal, individually adjustable biomedical system designed to monitor the basic physiological functions of each suited crewman during specified periods of a manned space mission. The basic physiological functions of this system include electrocardiogram, respiration by impedance pneumogram, body temperature, cardiotachometer, and subject identification. The Operational Bioinstrumentation System was scheduled to monitor each crewman during launch, extravehicular activities, suited intravehicular experiments, and undocking and return. Author

N77-33836*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

EXERCISER

John D. Lem *In its* Biomed. Results from Skylab 1977 p 485-486

Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06B

The Mark I exerciser which was added for the second and third Skylab missions, was used for a number of arm and leg exercises. This unit is a modified version of a commercial device. This is an iso-kinetic, or constant velocity, exerciser which retards the speed at which the user is allowed to move. The user applies a maximum effort and the device automatically varies the opposing resistance to maintain speed of translation at a constant preselected value. Author

N77-33837*# Battelle Pacific Northwest Labs., Richland, Wash. Occupational and Environmental Safety Dept.

INVESTIGATE METHODS FOR MEASURING MUSCLE AND BONE MASS CHANGES IN ASTRONAUTS AND ANIMALS WHICH OCCUR DURING SPACE FLIGHT Final Report, 1 Dec. 1976 - 31 Aug. 1977

H. E. Palmer 31 Aug. 1977 23 p refs

(Contract NAS9-14248)

(NASA-CR-151518) Avail: NTIS HC A02/MF A01 CSCL 06B

Sodium-22 is being used as a tracer for bone mineral metabolism studies. Dogs are being grown from puppies to adulthood on a diet containing a constant level of sodium-22 in order to uniformly tag the entire skeleton with a long lived radionuclide. This study is still in progress and the dogs are still growing. Potassium-40 measurements were made on people, who are replacing muscle mass lost due to leg injuries, in a second study. It appears that potassium-40 measurements provide an accurate and convenient method for determining relative changes in the muscle content of the leg. Author

N77-33838*# General Electric Co., Houston, Tex. Apollo Systems Dept.

SPACE SHUTTLE LIFE SCIENCES REQUIREMENTS DEVELOPMENT AND DOCUMENTATION Final Report

P. C. VanNordstrand 26 Sep. 1977 11 p

(Contract NAS9-14973)

(NASA-CR-151529; TIR-782-LSP-7014) Avail: NTIS HC A02/MF A01 CSCL 06B

Planning requirements identified in this study cover a range of functions including management plans, payload planning, optimization and analysis, flight and mission planning, and mission reporting, as well as all the design, integration and test functions that are hardware oriented. Some of the above functions would be done only once for the entire program, others would be done once for each payload, and others are applicable to each of the many experiments or end items in each payload. Author

N77-33839*# Hawaii Univ., Honolulu.

STUDY OF METABOLISM AND ENERGETICS IN HYPOGRAVITY: DEGENERATIVE EFFECTS OF PROLONGED HYPOGRAVITY Final Report, 1 Sep. 1971 - 1 Apr. 1976

Sanford M. Siegel 1 Nov. 1976 67 p refs

(Contract NAS2-8687)

(NASA-CR-155199) Avail: NTIS HC A04/MF A01 CSCL 06C

The role of gravity in the formation of rigid, lignified plant cell walls, hence to the development of the erect land plant body, is examined. An experiment was proposed with a general hypothesis that a chosen plant, a dwarf marigold, would display degenerative changes in mechanical supportive systems under hypogravity because normal lignin-cellulose wall structure fails to develop. Observational and experimental results are given. G.D.H.

N77-33840*# California Univ., Davis.

HIGHER PLANT METABOLISM AND ENERGETICS IN HYPOGRAVITY: AMINO ACID METABOLISM IN HIGHER PLANTS Final Report

Mendel Mazelis 31 Oct. 1976 40 p refs
(Contract NAS2-8685)
(NASA-CR-155198) Avail: NTIS HC A03/MF A01 CSCL 06C

Laboratory's investigation into the amino acid metabolism of dwarf marigolds exposed to an environment of simulated hypogravity is summarized. Using both in vivo, and/or in vitro studies, the following effects of hypogravitational stress have been shown: (1) increased proline incorporation into cell wall protein, (2) inhibition of amino acid decarboxylation, (3) decrease in glutamic acid decarboxylase activity; and (4) decrease in the relative amount of a number of soluble amino acids present in deproteinized extracts of marigold leaves. It is concluded from these data there are several rapid, major alterations in amino acid metabolism associated with hypogravitational stress in marigolds. The mechanism(s) and generality of these effects with regard to other species are still unknown. Author

N77-33841# Joint Publications Research Service, Arlington, Va.
TRANSLATION ON USSR SCIENCE AND TECHNOLOGY BIOMEDICAL SCIENCES, NO. 9
3 Oct. 1977 77 p Transl. into ENGLISH from Selected Foreign Periodicals (USSR)
(JPRS-69899) Avail: NTIS HC A05/MF A01

Information on aerospace medicine, agrotechnology, bionics and bioacoustics, biochemistry, biophysics, environmental and ecological problems, food technology, and microbiology is reported. Investigations in epidemiology and immunology, marine biology, military medicine, physiology, public health and toxicology are also included. Scientists and scientific organizations in biomedical fields are cited along with studies in radiobiology, veterinary medicine, behavioral science, human engineering, psychology and psychiatry. Author

N77-33842# Joint Publications Research Service, Arlington, Va.
TRANSLATIONS ON USSR SCIENCE AND TECHNOLOGY BIOMEDICAL SCIENCES, NO. 10
6 Oct. 1977 57 p Transl. into ENGLISH from Selected Foreign Periodicals (USSR)
(JPRS-69924) Avail: NTIS HC A04/MF A01
For abstract, see N77-33841.

N77-33843# Joint Publications Research Service, Arlington, Va.
SPACE BIOLOGY AND AEROSPACE MEDICINE, NO. 4, 1977
14 Oct. 1977 97 p Transl. into ENGLISH from Selected Foreign Periodicals (USSR)
(JPRS-69964) Avail: NTIS HC A05/MF A01

Articles are presented concerning: (1) the selection and training of cosmonauts; (2) evaluation and analysis of accumulated data to facilitate the on-going transition from orbital to interplanetary flight; (3) research aimed at guaranteeing safety on long flights and reliability of the human component of the man-spaceship system; (4) space psychology and physiology; (5) environmental problems and control; and (6) telemetry. Author

N77-33844# Joint Publications Research Service, Arlington, Va.
TRANSLATIONS ON USSR SCIENCE AND TECHNOLOGY BIOMEDICAL SCIENCES, NO. 12
25 Oct. 1977 52 p Transl. into ENGLISH from Selected Foreign Periodicals (USSR)
(JPRS-70017) Avail: NTIS HC A04/MF A01

Selected papers on neurosurgery and public health are presented. Health indexes for construction workers, noise vibration standards, and vibration sensitivity are discussed along with industrial safety factors. J.M.S.

N77-33845*# Scientific Translation Service, Santa Barbara, Calif.
RETENTION OF SELECTED PHYSIOLOGICAL INDICATORS IN PILOTS IN THE COURSE OF AGRICULTURAL FLIGHTS
Lech Markiewicz, Danuta Koradecka, and Maria Konarska Washington NASA Aug. 1977 14 p Transl. into ENGLISH of Polish conf. paper Presented at Ergonomics in Aviat: 1st Natl. Sci. Technol. Conf., Warsaw, 17-19 Mar. 1975 p 41-52 Original language document was announced as A76-28530
(Contract NASw-2791)
(NASA-TT-F-17441) Avail: NTIS HC A02/MF A01 CSCL 06S

Stress on the organism of pilots maneuvering fixed-wing or rotary-wing aircraft in crop-dusting and sowing operations, with abrupt changes in terrain and sharp turns required, is studied on the basis of telemetered heart rate, tremorgrams, indications of muscle fatigue (particularly, flexor muscles of the fingers), and response to vibrations. Comparisons are made of data for low-level flight over even terrain and nap-of-the-earth flight over hilly terrain. Responses in fixed-wing flight and helicopter flight are also contrasted. Criteria are proposed for optimization of piloting conditions in this type of service. Restrictions on interpretation of the data are stated, and data are presented in tabular and graphic form. Author

N77-33846*# Scientific Translation Service, Santa Barbara, Calif.
ACTIVITY OF THE DIGESTIVE SYSTEM DURING 49-DAY ANTIORTHOSTATIC HUMAN HYPOKINESIA
K. V. Smirnov and L. G. Goland Oct. 1977 16 p refs Transl. into ENGLISH from Fiziol. Cheloveka (USSR), v. 2, Jul. - Aug. 1976 p 653-660 Original language document was announced as A77-14179
(Contract NASw-2791)
(NASA-TM-75177) Avail: NTIS CSCL 06S

It is proposed that the obtained changes in the functional condition of the digestive system during experimental hypokinesia be studied since it is of practical importance for clinical medicine in cases where a patient remains confined to bed for a lengthy period. Antiorthostatic hypokinesia for 49 days was found to have a significant effect on the functions of the organs in the gastorintestinal tract. These effects included: an increase in stimulated juice secretion and acid formation; phase changes in the activity of the digestive enzymes; depression of the gastric motor function; and intensification of bile formation. Author

N77-33847*# San Jose State Univ., Calif. Dept. of Psychology.
VESTIBULAR-VISUAL INTERACTIONS IN FLIGHT SIMULATORS Final Report, 1 Sep. 1967 - 30 Sep. 1977
Brant Clark Sep. 1977 30 p refs
(Grant NGL-05-046-002)
(NASA-CR-155200) Avail: NTIS HC A03/MF A01 CSCL 05E

All 139 research papers published under this ten-year program are listed. Experimental work was carried out at the Ames Research Center involving man's sensitivity to rotational acceleration, and psychophysical functioning of the semicircular canals; vestibular-visual interactions and effects of other sensory systems were studied in flight simulator environments. Experiments also dealt with the neurophysiological vestibular functions of animals, and flight management investigations of man-vehicle interactions. J.L.H.

N77-33848# Kentucky Univ., Lexington. Wenner-Green Research Lab.
RESPONSE OF THE CARDIOVASCULAR SYSTEM TO VIBRATION AND COMBINED STRESSES Interim Scientific Report, 1 Sep. 1975 - 30 Sep. 1976
Charles F. Knapp 30 Sep. 1976 50 p refs
(Contract F44620-74-C-0012)
(AD-A039000; AFOSR-77-0518TR) Avail: NTIS HC A03/MF A01 CSCL 06/19

Low frequency, sinusoidal accelerations were used to quantify the frequency response of cardiovascular regulation in awake, chronically instrumented canines using pharmacologic blocking agents to delineate the relative contributions of cardiac and peripheral vascular mechanisms required to maintain circulatory integrity during time-dependent acceleration loadings. Cyclic heart rate changes observed in the unblocked animals were almost

always the same as those of the sinusoidal acceleration for frequencies up to 0.3 Hz. Preliminary results using pharmacologic blockage indicate that the open loop response of aortic pressure is maximal between 0.04 and 0.06 Hz and that the influence of peripheral mechanisms is evident up to 0.03 Hz. GRA

N77-33849# California Univ., Los Angeles. Lab of Environmental Neurobiology.

NEUROPHYSIOLOGICAL ESTIMATES OF HUMAN PERFORMANCE CAPABILITIES IN AEROSPACE SYSTEMS Final Scientific Report, 1 Oct. 1974 - 30 Sep. 1976

W. R. Adey 30 Nov. 1976 155 p refs
(Contract F44620-75-C-0030)
(AD-A038208; AFOSR-77-0362TR) Avail: NTIS HC A08/MF A01 CSCL 06/19

The objective of this work was the determination of physiological estimators of stress during task performance, recognition of physiological status in operators of weapon systems and the understanding of the mechanisms relating to stresses encountered under operational conditions. The data cover a wide range of human performance measures and the physiological mechanisms which underlie these measures. The studies included levels of performance after sleep interruptions, human operator performance capability following varying periods of exposure to a range of angles of a simulated cockpit seat, effects of weak environmental electromagnetic fields on calcium ion binding in cerebral tissue, development of a biomedical monitoring system with capability for command transmission over limited bandwidths channels, evaluation of operational potential of remote medical monitoring by cryomagnetometry, and other techniques for no-contact monitoring and biomedical sensing in performing subjects. GRA

N77-33850# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

BIBLIOGRAPHY OF RESEARCH REPORTS AND PUBLICATIONS: IMPACT, VIBRATION, WINDBLAST AND ESCAPE, 1942 - 1976

Richard J. Zember and Joan Lanby Robinette Jul. 1977 50 p
(AF Proj. 7231)
(AD-A042201; AMRL-TR-76-120) Avail: NTIS HC A03/MF A01 CSCL 06/19

This bibliography lists technical reports in the areas of impact, vibration, windblast, and escape published from 1942 to 1976 by the Aerospace Medical Research Laboratory. Five appendices include titles of reports in the areas of impact, windblast and escape published from 1942 to 1958 by Aeromedical Research Laboratory, Holloman AFB, New Mexico, and USAF School of Aerospace Medicine, Brooks AFB, Texas. Author (GRA)

N77-33851# Los Alamos Scientific Lab., N. Mex.

AUTOMATED CHEST X-RAY ANALYSIS

E. L. Hall (Univ. of Southern Calif., Los Angeles), B. K. Rouge (Univ. of Southern Calif., Los Angeles), and R. P. Kruger 1977 10 p refs Presented at 20th Ann. SPIE Tech. Symp., San Diego, Calif., 23 Aug. 1976
(Contracts W-7405-eng-36; HSM-99-73-92)
(LA-UR-77-532) Avail: NTIS HC A02/MF A01

A computer hardware-software system was developed for extracting optical and digital measurements from chest X-rays and using these measurements to classify the severity of lung disease. The system consists of a digital image scanner and an optical system consisting of an x-y controller for film transportation and an RSI Fraunhofer diffraction pattern sampling unit. Initially the classification was of opacity textural patterns associated with coal workers pneumoconiosis (CWP), however, the system appears to be expandable to all diseases described in the international standard with only software modification. Extensions to large opacity detection, measures of ling vascularity and lung and heart volume were made. Results indicate classification accuracy rates for pneumoconioses comparable to visual readings of the films by expert radiologists, and significantly better than non-radiologist physicians who often read these films. ERA

N77-33852# Royal Norwegian Council for Scientific and Industrial Research, Trondheim. Akustisk Lab.

NOISE INDUCED HEARING LOSS. NOISE EVALUATION. THE USE OF HEARING PROTECTORS

Gordon Flottorp and Sverre Quist-Hansen 1975 21 p refs In NORWEGIAN; ENGLISH summary
(NTNF-4) Avail: NTIS HC A02/MF A01; Roy. Norweg. Council for Sci. and Ind. Res., Trondheim Nor. Kr. 30

Some of the arguments behind the criteria for noise induced hearing loss, presented by health inspectors in Norway, are discussed. Noise limits specified by these criteria are often found to be exceeded. ESA

N77-33853# Bureau of Radiological Health, Rockville, Md. WHO Collaborating Center for Standardization of Protection Against Nonionizing Radiations.

BIOLOGICAL EFFECTS OF ELECTROMAGNETIC WAVES. SELECTED PAPERS OF THE USNC/URSI ANNUAL MEETING, VOLUME 2 Annual Report

C. Johnson, ed. (Utah Univ.) and M. Shore, ed. Apr. 1977 478 p refs Meeting held at Boulder, Colo., 20-23 Oct. 1975; sponsored in part by International Union of Radio Science, Washington, D.C., US National Committee
(PB-268095/7; DHEW/PUB/FDA-77/8011; FDA/BRH-77/98) Avail: NTIS HC A21/MF A01 CSCL 06R

Subjects reported include: (1) high voltage electric field coupling to humans using moment method techniques; (2) measurement of radiofrequency power absorption in monkeys, monkey phantoms, and human phantoms exposed to 10-50 MHz fields; (3) theoretical calculations of power absorbed by monkey and human prolate spheroidal phantoms in an irradiation chamber; (4) interaction of microwave frequency and polarization with animal size; (5) the biological significance of radiofrequency radiation emission on cardiac pacemaker performance; (6) methods and instrumentation for the evaluation and calibration of microwave survey instruments; (7) a new system for investigating nonthermal effect of microwaves on cells; (8) mapping of free space and scattered fields in microwave diathermy; (9) a two impedance method for wide range dielectrometry. GRA

N77-33854# California Univ., Berkeley. Architecture Life Safety Group.

HUMAN BEHAVIOR IN INSTITUTIONAL FIRES AND ITS DESIGN IMPLICATIONS Final Report

Lars Lerup, David Cronrath, and John Koh Chiang Liu 28 Feb. 1977 187 p refs
(Grant NBS-6-9013)
(NBS-GCR-77-93) Avail: NTIS HC A09/MF A01

Design implications were derived from the in-depth analysis of behavior in institutional settings under fire. The context and data were drawn from ten case studies of significant nursing home fires which occurred in the United States between 1970 and 1974. The methodology used is based on a graphical (Pictorial) and narrative mapping of fire and people behavior. Author

N77-33855# School of Aerospace Medicine, Brooks AFB, Tex. Aerospace Medical Div.

PSYCHOMETRIC CHARACTERISTICS OF ASTRONAUTS

Bryce O. Hartman and Richard C. McNee Mar. 1977 18 p refs
(AD-A039228; SAM-TR-5; SAM-Review-1-77167930) Avail: NTIS HC A02/MF A01 CSCL 05/9

Detailed information on the role of psychological testing in the selection process for NASA astronauts has been reported only in a fragmentary manner because of the sensitive nature of this information. With the lapse of time since the initiation of the U.S. manned space program, this information has become essentially of only historic interest. However, because of the current activity in the European space agency, where there is a requirement for astronaut selection, psychometric procedures and data are of renewed scientific interest. An overview of the psychometric process and extensive statistical analyses are reported. Author (GRA)

N77-33856# Human Engineering Labs., Aberdeen Proving Ground, Md.

A REVIEW OF THE LITERATURE ON THE LEGIBILITY OF ALPHANUMERICS ON ELECTRONIC DISPLAYS Final Report

Andrew T. Buckler May 1977 18 p refs
(AD-A040625; HEL-TM-16-77) Avail: NTIS HC A02/MF A01 CSCL 05/5

This report reviews the available literature on the legibility of alphanumeric characters on electronic displays. The purpose was to identify the important parameters involved in legibility and to provide a summary of previous research findings in this area. Effort was made to determine the acceptability of principles derived from conventional media for applications with electronic displays. Also, new questions and problems created by electronic display technology are discussed. Conclusions are drawn and recommendations made where sufficient data are available, and further questions and problems are posed for future research.
GRA

N77-33857# Texas Technological Univ., Lubbock.

IMPROVED SEAT, CONSOLE, AND WORKPLACE DESIGN: ANNOTATED BIBLIOGRAPHY, INTEGRATION OF THE LITERATURE, ACCOMMODATION MODEL, AND SEATED OPERATOR REACH PROFILES

M. M. Ayoub and C. G. Halcomb 31 Dec. 1976 348 p refs (Contract N61756-75-M-2986)
(AD-A040479; PMTC-TP-76-1) Avail: NTIS HC A15/MF A01 CSCL 05/5

This report was prepared with the objective of integrating pertinent information regarding seat, console, and workplace design. The four sections include: (1) An annotated bibliography about seating, console, and workplace designs. Each relevant publication is summarized to reflect a category, author, title, methodology, rationale, significant results, conclusions, and recommendations; (2) Integration of the seat, console, and workplace design. The detailed aspects of these components and their relationship to each other in making up the workplace are discussed; (3) A workplace-accommodated percentage evaluation model. A model and preliminary results are presented to show the percentage excluded from a seat/console design, given the percentage excluded based on individual dimensions; and (4) Reach profiles for restrained and unrestrained males and females. Reach envelope data and new methodologies for collecting data are presented, and are compared with existing reach data. GRA

N77-33858# Human Engineering Labs., Aberdeen Proving Ground, Md.

INVESTIGATION OF INSIDE LIGHT REFLECTION PROBLEM ON THE FLAT PLATE CANOPY (FPC) FOR MODEL 209 AH-1S HELICOPTER Final Report

Harry R. Stowell and Christopher C. Smythe Apr. 1977 46 p refs
(AD-A041332; HEL-TM-13-77) Avail: NTIS HC A03/MF A01 CSCL 01/3

Various approaches were examined for a possible solution to the light-reflection problem inside the Model 2 AH-1s helicopter cockpit with the flat-plate canopy FPC. A computer program was developed to identify primary light reflections inside the FPC at the pilot's eye position. Modifying the side panels on the FPC with curved surfaces may be the only satisfactory solution to the inside light-reflection problem. Author (GRA)

N77-33859# Aerospace Research Labs., Wright-Patterson AFB, Ohio.

A SPATIAL FREQUENCY ANALYSIS MODEL FOR PREDICTING HUMAN PERFORMANCE AT VISUAL PATTERN MATCHING TASKS

Mark W. Cannon, Jr. Jun. 1977 8 p refs Presented at Systems, Man and Cybernetics Soc., Washington, D. C., 19-21 Sep. 1977 Submitted for publication
(AD-A041649; AMRL-TR-77-43) Avail: NTIS HC A02/MF A01 CSCL 05/8

A model for simulating human performance in visual pattern matching tasks is presented. The model is based on evidence of spatial frequency processing in the visual system, and on the hypothesis that shape recognition is determined only by the low spatial frequency harmonics of the image. Two psychophysical pattern matching experiments are described that demonstrate a clear functional relationship between the 'similarity' of two patterns as judged by human observers and the Euclidean distance between spatially filtered Fourier transforms of the patterns. Author (GRA)

N77-33860# Air Force Human Resources Lab., Brooks AFB, Tex. Advanced Systems Div.

EFFECTS OF VISUAL PROPRIOCEPTIVE CUE CONFLICTS ON HUMAN TRACKING PERFORMANCE Ph.D. Thesis - Ohio State Univ.

Lawrence E. Reed Jun. 1977 226 p refs
(AD-A042006; AFHRL-TR-77-3223) Avail: NTIS HC A11/MF A01 CSCL 17/8

The purpose of this experiment was to investigate operator performance in an environment which was highly conducive to visual-proprioceptive conflict. The experimental task required that subjects maneuver a simulated remotely piloted vehicle from a simulated airborne control station (i.e., 'mother ship'). The vehicle and/or the station were given gust-like disturbances on pitch and/or roll. In a between groups design the performance of pilots, navigators, and non-rated Air Force officers was compared under conditions of conflict (e.g., visual roll right and roll left motion), non-conflict, motion only, and no motion. To maintain adequate performance it was neccessary for the subjects to disregard sensations of motion. The results revealed that the conditions of conflict engendered the highest proportion of reversal errors by all subjects. The past experience of pilots did not help them overcome the effects of conflict as measured by reversal errors, but it did help them reduce response latencies. The effects of practice were evidenced primarily by a reduction of reversal errors under conditions of conflict. Strong evidence was found to support the notion that motion plays an alerting function and also provides information on the direction of attitude changes. Author (GRA)

N77-33861# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Physik der Atmosphaere.

THE MAXIMUM DETECTION RANGE AND THE MAXIMUM RECOGNITION DISTANCE WHEN OBSERVING GROUND TARGETS FROM HELICOPTERS

H.-E. Hoffmann and R. H. Buell 10 Aug. 1976 73 p refs In GERMAN; ENGLISH summary
(DLR-IB-553-76/3) Avail: NTIS HC A04/MF A01

The visibility of ground targets (tank Leopard or 1.5 t truck) was studied by observation from a helicopter. Observation was done mostly with the naked eye; for some approaches, however, 8 x 30 binoculars were used. Continuous approaches and observations with the naked eye resulted in the following: the maximum detection range for approaches from a northern direction was up to more than 3 km larger than for approaches from a southern direction; the differences for the maximum recognition range were up to 3 km. At horizontal standard visibilities between 18 and 30 km the maximum detection range was between 3 and 4 km, the maximum recognition range being between 2 and 2.5 km. When hovering and observing with the naked eye, the following results were obtained: if in daylight the target is detected from 4.6 km, 15 min after sunset the detection distances were 3.2 to 2.1 km. The recognition distance was 1.7 km in daylight and 0.8 km 15 minutes after sunset.
Author (ESA)

N77-33862# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Physik der Atmosphaere.

SOME TEST RESULTS ON THE VISIBILITY OF OBSTACLE AND HAZARD BEACONS

H.-E. Hoffmann and R. H. Buell 21 Sep. 1976 39 p refs In GERMAN; ENGLISH summary
(DLR-IB-553-76/5) Avail: NTIS HC A03/MF A01

The maximum detection range when observing a 100 W and a 150 W obstacle beacon and a 1000 W hazard beacon (rotation beacon) was determined from an approaching helicopter. The following results were found: during sunset and horizontal

standard visibilities of 10 to 13 km, the 150 W obstacle beacon was detected at distances of 3.5 to 5 km; during nighttime the maximum detection range for the 150W obstacle beacon increased to 6 to 14 km; the fluctuation of the maximum detection range, most likely caused by unperceived inhomogenities of the atmosphere was at maximum 7 km; significant differences between the maximum detection ranges for the 100 W and the 150 W obstacle beacon were not registered; and the maximum detection range for the 1000 W hazard beacon was between 3 and 8 km larger than for the two obstacle beacons.

Author (ESA)

N77-33863# Technische Hochschule, Darmstadt (West Germany). Fachbereich Informatik.

INTERACTIVE SYSTEM DESIGN CONSIDERATIONS [BETRACHTUNGEN ZUM ENTWURF INTERAKTIVER SYSTEME]

Hans-Juergen Hoffmann Dec. 1976 68 p refs In GERMAN; ENGLISH summary Presented at the Symp. on Interactive Systems, Bad Homburg, West Ger., 22-24 Sep. 1976

(PU1R2/76) Avail: NTIS HC A04/MF A01

Requirements to be fulfilled by interactive systems are discussed, and some system components are presented which cooperatively allow realization of some desirable properties of the system operation.

Author (ESA)

N77-33864# Michigan Univ., Ann Arbor. Highway Safety Research Inst.

TOLERANCE AND RESPONSE OF THE KNEE-FEMUR-PELVIS COMPLEX TO AXIAL IMPACT

J. W. Melvin and R. L. Stalnaker 1976 52 p refs Sponsored by Motor Vehicle Mfr. Assoc. of the United States, Inc.

(PB-269059/2; UM-HSRI-76-33) Avail: NTIS HC A04/MF A01 CSCL 05H

The tolerance and response of the human patella-femur-pelvis complex to axial impact force applied to the knee of seated vehicle occupants is defined. The results of direct impact and driving point impedance measurments of the flexed legs of seated unembalmed human cadavers is presented. Comparisons of the cadaver responses are made with similar tests on a test dummy. A total of 58 individual impact tests to the knees of cadavers were conducted for various impact test conditions--rigid, lightly padded and thickly padded impact surfaces. Accident investigation data analysis is used as an aid to interpreting the test results.

GRA

N77-33865# Michigan Univ., Ann Arbor. Highway Safety Research Inst.

GUIDEBOOK ON ANTHROPOMORPHIC TEST DUMMY USAGE Final Report, Jul. 1976 - Mar. 1977

D. H. Robbins 31 Mar. 1977 84 p refs

(Grant NBS-6-9011)

(PB-268904/0; UM-HSRI-BI-77-19; NBS-GCR-77-91) Avail: NTIS HC A05/MF A01 CSCL 14B

The role of impact test dummies in developing countermeasures to cope with the high incidence of safety problems related to building structures is discussed. Dummies are classified according to sophistication ranging from anthropometric form to impact body blocks and finally to sophisticated anthropomorphic test devices used in automotive safety. Test procedures and data processing are discussed. A bibliography, coded by subject, is also included.

GRA

N77-33866# Boeing Computer Services, Inc., Seattle, Wash. Energy Technology Applications.

PROMETHEUS 2: A USER ORIENTED PROGRAM FOR HUMAN CRASH DYNAMICS Final Report, Jun. 1973 - Aug. 1976

David W. Twigg Jun. 1977 212 p refs

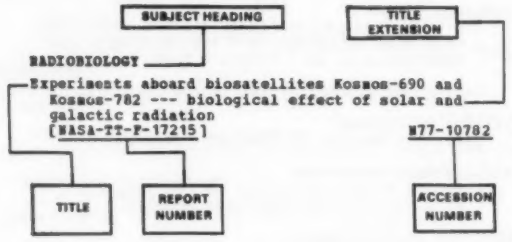
(Contract DOT-HS-356-3-719)

(PB-269305/9; BCS-G0802; DOT-HS-802-423) Avail: NTIS HC A10/MF A01 CSCL 13F

Simulation of a pedestrian being struck in the side by the front of an automobile was conducted using a mathematical model composed of eleven linked rigid segments. A nonlinear finite element model of the vehicle structure is incorporated which interacts realistically with the victim. Various restraint systems can be simulated. PROMETHEUS 2 input aids include free field data input and an on-line data edit capability. Output provides user selected time-history and occupant configuration plots as well as abbreviated output lists for a rapid scan of results. GRA

SUBJECT INDEX

Typical Subject Index Listing



The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by three hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

ABERRATION
Cytogenetic studies of blood, experiment M111
N77-33804

ABIOGENESIS
Chlorophyll derivatives in modern soils in relation to the problem of the chemical evolution and origin of life on earth
A77-48034

ABSORPTION SPECTRA
Evaluation of single-pigment shift model of anomalous trichromacy
A77-49308

ACCELERATION STRESSES (PHYSIOLOGY)
Disorienting effects of aircraft catapult launchings. III - Cockpit displays and piloting performance
A77-49826
Lower body negative pressure: Third manned Skylab mission
N77-33809
Vectorcardiographic results from Skylab medical experiment M092: Lower body negative pressure
N77-33810
Hemodynamic studies of the legs under weightlessness
N77-33811
Lower body negative pressure device
N77-33821
Vestibular-visual interactions in flight simulators
[NASA-CR-155200]
N77-33847

ACCELERATION TOLERANCE
Response of the cardiovascular system to vibration and combined stresses
[AD-A039000]
N77-33848

ACCIDENT INVESTIGATION
PROMETHEUS 2: A user oriented program for human crash dynamics
[PB-269305/9]
N77-33866

ACCIDENT PREVENTION
Crew behavior in accident causation --- pilot as information processor
A77-50752
Previous disease in aircrew killed in flying accidents
A77-50755

ACID BASE EQUILIBRIUM
Acid-base equilibrium of rat blood during the combined action of hypercapnia, hypoxia and cooling
A77-50748

ACTIVITY (BIOLOGY)
Functional relation between the spectrum of atmospheric electrical discharges and biological activity of living organisms
A77-49468

ADAPTATION
Task and work performance on Skylab missions 2, 3, and 4: Time and motion study: Experiment M151
N77-33796
Crew efficiency on first exposure to zero-gravity
N77-33797

ADAPTIVE CONTROL
Application of optimal and adaptive algorithm control to the system robot-manipulator in cosmic space
[IAF PAPER 77-ST-02]
A77-51567

ADENOSINE TRIPHOSPHATE
Some aspects of energy metabolism in human blood erythrocytes under hypokinesia and during space flights
A77-49831

ADRENAL GLAND
Ontogenetic features of the reaction of adrenergic systems to hypergravity
A77-48479

ADRENAL METABOLISM
Reaction of the adrenal cortex and medulla to prolonged space flight in Wistar rats
[IAF PAPER 77-261]
A77-51501

AERODYNAMIC LOADS
A review of methods for estimation of aeroacoustic loads on flight vehicle surface, volume 2
[AD-A042783]
N77-32720

AEROSPACE ENVIRONMENTS
Application of optimal and adaptive algorithm control to the system robot-manipulator in cosmic space
[IAF PAPER 77-ST-02]
A77-51567

AEROSPACE MEDICINE
Some aspects of the clinical training of aviation physicians
A77-48461
The significance of a psychophysiological norm for flying time for the medical safeguarding of flights
A77-48463
The ability to endure Coriolis force and some questions of vestibular choice
A77-50923
Hemodynamic studies of the legs under weightlessness
N77-33811
Anthropometric changes and fluid shifts
N77-33812
Vectorcardiographic changes during extended space flight (M093): Observations at rest and during exercise
N77-33813
Effect of prolonged space flight on cardiac function and dimensions
N77-33815
Results of Skylab medical experiment M171-metabolic activity
N77-33816
Metabolic cost of extravehicular activities
N77-33818
Automatic blood pressure measuring system (M092)
N77-33823
A.I.e. in-flight blood collection system
N77-33825
In-flight medical support system
N77-33832
Translation on USSR science and technology biomedical sciences, no. 9
[JPRS-69899]
N77-33841

Translations on USSR science and technology biomedical sciences, no. 10
[JPRS-69924] N77-33842
Space Biology and Aerospace Medicine, no. 4, 1977
[JPRS-69964] N77-33843
Neurophysiological estimates of human performance capabilities in aerospace systems
[AD-A038208] N77-33849
Bibliography of research reports and publications: Impact, vibration, windblast and escape, 1942 - 1976
[AD-A042201] N77-33850

AGE FACTOR
Lung capacities of healthy subjects of different ages A77-49439
Age differences in human external respiration response to hyperoxic and hypoxic gas mixtures A77-49440
Age-related changes in the mucopolysaccharide content in human coronary-artery walls A77-49472

AGRICULTURE
Retention of selected physiological indicators in pilots in the course of agricultural flights
[NASA-TT-F-17441] N77-33845

AIR POLLUTION
Ecological aspects of respiratory physiology and hereditary variations in reactivity A77-49437

AIR TRAFFIC CONTROL
The controller and automation --- computerized air traffic control A77-49223

AIRCRAFT ACCIDENT INVESTIGATION
Crew behavior in accident causation --- pilot as information processor A77-50752
Cause of death in aircraft accidents - Drowning vs. traumatic injuries A77-50753
Laboratory examination of unidentified suspected tissue fragments found at aircraft sites A77-50754
Previous disease in aircrew killed in flying accidents A77-50755
Ischaemic heart disease - A problem in aircraft accident reconstruction A77-50759
Medical investigation of fatalities from aircraft-accident burns A77-50760
Correlation of occurrence of aircraft accidents with biorhythmic criticality and cycle phase in U.S. Air Force, U.S. Army, and civil aviation pilots A77-50763

AIRCRAFT DETECTION
Results of field experiments concerning visibility of objects
[DLR-IB-553-77/3] N77-32730

AIRCRAFT INSTRUMENTS
Disorienting effects of aircraft catapult launchings. III - Cockpit displays and piloting performance A77-49826
Effect of virtual image projection distance on the accommodative response of the eye A77-49830

AIRCRAFT LAUNCHING DEVICES
Disorienting effects of aircraft catapult launchings. III - Cockpit displays and piloting performance A77-49826

AIRCRAFT MANEUVERS
Retention of selected physiological indicators in pilots in the course of agricultural flights
[NASA-TT-F-17441] N77-33845

AIRCRAFT NOISE
A review of methods for estimation of aeroacoustic loads on flight vehicle surface, volume 2
[AD-A042783] N77-32720

AIRCRAFT PILOTS
Continuous ECG monitoring on civil air crews during flight operations A77-49838
Prevention of visual anxiety and proficiency problems in the senior air transport pilot A77-49839
The helmet protects the aviator's head - Or does it A77-50660
Evaluation and disposition of Army helicopter aviators with finger amputations A77-50756
Round window tear in aviators --- middle ear damage as aircraft accident cause A77-50762

AIRCRAFT SAFETY
The objective evaluation of aircrew protective breathing equipment. I - Oxygen mask/goggles combinations. II - Fullface masks and hoods A77-49927
USAFSAM evaluation of the Sierra Lightweight Helmet A77-49952

AIRLINE OPERATIONS
Emergency medical kits aboard aircraft A77-49840

ALPHANUMERIC CHARACTERS
A review of the literature on the legibility of alphanumerics on electronic displays.
[AD-A040625] N77-33856

ALTITUDE ACCLIMATIZATION
Morphological and histochemical indices of compensatory adaptations in organs in response to oxygen insufficiency A77-49444

ALTITUDE SIMULATION
Hormonal changes under altitude stress A77-47991

ALVEOLAR AIR
Functional changes in the respiratory system of dogs in the case of alveolar hypoxia with hypercapnia A77-50749

ALVEOLI
Age differences in human external respiration response to hyperoxic and hypoxic gas mixtures A77-49440

AMINO ACIDS
Higher plant metabolism and energetics in hypogravity: Amino acid metabolism in higher plants
[NASA-CR-155198] N77-33840

AMMONIA
Effect of ammonia on Swiss albino mice A77-50635

AMPLIFIER DESIGN
The problem of constructing bioamplifiers for dynamic biotelemetry studies A77-50909

ANGIOGRAPHY
Finite element stress analysis of the human left ventricle whose irregular shape is developed from single plane cineangiocardiogram A77-51260

ANIMALS
Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system A77-50631
Variation in animal response to different toxicants A77-50636
A review of available LC/50/ data --- on toxic gases encountered in fires A77-50638

ANTHROPOMETRY
Anthropometric changes and fluid shifts N77-33812

ARCHITECTURE
Human behavior in institutional fires and its design implications
[NBS-GCR-77-93] N77-33854

ARTERIES
The functional state of the cardiovascular system with sinocarotid reflex A77-49445
The dependence of intraocular pressure and central artery collapse pressure upon weightlessness. Methodical approach to experiments during Spacelab flight N77-32711

ASTRONAUT PERFORMANCE
Rotational motion of an astronaut's trunk --- body attitude change by arm and leg motions in weightlessness A77-50308
Current problems in space biorhythmology --- Russian book A77-50686
ASTRONAUTS
Investigate methods for measuring muscle and bone mass changes in astronauts and animals which occur during space flight [NASA-CR-151518] N77-33837
Psychometric characteristics of astronauts [AD-A039228] N77-33855
ATHLETES
Respiration efficiency of athletes engaged in muscular activity of different intensity A77-49441
Changes in energy consumption rate and respiratory functions of athletes subjected to thermal stress A77-49442
ATMOSPHERIC COMPOSITION
Atmospheric analyzer, carbon monoxide monitor and toluene diisocyanate monitor N77-33834
ATMOSPHERIC ELECTRICITY
Functional relation between the spectrum of atmospheric electrical discharges and biological activity of living organisms A77-49468
AUDITORY DEFECTS
The effect of prolonged hypokinesis on the function of the auditory analyzer A77-48464
Noise induced hearing loss. Noise evaluation. The use of hearing protectors [NTNF-4] N77-33852
AUDITORY PERCEPTION
The effect of prolonged hypokinesis on the function of the auditory analyzer A77-48464
AUTOMATA THEORY
Mechanized experiment planning in automaton-environment systems A77-49335
AUTOMATION
The controller and automation --- computerized air traffic control A77-49223
AUTOMOBILE ACCIDENTS
Tolerance and response of the knee-femur-pelvis complex to axial impact [PB-269059/2] N77-33864
PROMETHEUS 2: A user oriented program for human crash dynamics [PB-269305/9] N77-33866
AUTOPSIES
Cause of death in aircraft accidents - Drowning vs. traumatic injuries A77-50753

B

BARRIERS
Some test results on the visibility of obstacle and hazard beacons [DLR-IB-553-76/5] N77-33862
BEACONS
Some test results on the visibility of obstacle and hazard beacons [DLR-IB-553-76/5] N77-33862
BEAM SPLITTERS
Effect of virtual image projection distance on the accommodative response of the eye A77-49830
BED REST
Cardiorespiratory responses to exercise after bed rest in men and women A77-50444
BIBLIOGRAPHIES
Vestibular-visual interactions in flight simulators [NASA-CR-155200] N77-33847
Bibliography of research reports and publications: Impact, vibration, windblast and escape, 1942 - 1976 [AD-A042201] N77-33850
BIOASTRONAUTICS
Current problems in space biorhythmology --- Russian book A77-50686
Problems of rehabilitation and recovery of altered physiological functions after space flight [IAF PAPER 77-253] A77-51499
BIOCHEMISTRY
Biochemical responses of the Skylab crewmen: An overview N77-33803
BIOCONTROL SYSTEMS
Muscular control during some voluntary motions with one degree of freedom. II - Multiple motions A77-48320
Hemodynamics in the case of combining nociceptive stimulation with stimulation of the amygdaloid complex after acting upon the sensorimotor region of the cortex A77-50746
BIOENGINEERING
Rotational motion of an astronaut's trunk --- body attitude change by arm and leg motions in weightlessness A77-50308
BIOINSTRUMENTATION
Use of a GL-5118 gas analyzer to measure the amount of oxygen consumption under conditions of increased pressure of the gaseous medium A77-50750
The problem of constructing bioamplifiers for dynamic biotelemetry studies A77-50909
An electrode system for tetrapolar electrical impedance plethysmography of the finger A77-51616
Lower body negative pressure device N77-33821
Automatic blood pressure measuring system (M091) N77-33822
Automatic blood pressure measuring system (M092) N77-33823
Vectorcardiograph N77-33824
Metabolic analyzer N77-33827
Hardware report for experiment M133, sleep monitoring on Skylab N77-33829
Experiment support system N77-33831
In-flight medical support system N77-33832
Skylab hardware report operational bioinstrumentation system N77-33835
BIOLOGICAL EFFECTS
Functional relation between the spectrum of atmospheric electrical discharges and biological activity of living organisms A77-49468
Model for some nonthermal effects of radio and microwave fields on biological membranes A77-49503
Internal EM field and absorbed power density in human torsos induced by 1-500-MHz EM waves A77-49504
Biological effect of fire suppression by nitrogen pressurization in enclosed environments A77-50630
Reparative processes in spleen and peripheral blood after the outset of continuous irradiation [IAF PAPER 77-266] A77-51506
Effect of prolonged space flight on cardiac function and dimensions N77-33815
Pulmonary function evaluation during and following Skylab space flights N77-33817
Determination of cardiac size from chest roentgenograms following Skylab missions N77-33819
Automatic blood pressure measuring system (M092) N77-33823
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI Annual Meeting, volume 2 [PB-268095/7] N77-33853

BIOLOGICAL EVOLUTION
Ecological aspects of respiratory physiology and hereditary variations in reactivity
A77-49437
BIOLOGY
Translation on USSR science and technology biomedical sciences, no. 9
[JPRS-69899] N77-33841
Translations on USSR science and technology biomedical sciences, no. 10
[JPRS-69924] N77-33842
BIOMEDICAL DATA
Some problems in cardiac electrokymography
A77-49446
Biomedical results from Skylab
[NASA-SP-377] N77-33780
Skylab medical program overview
N77-33781
Flight control experiences
N77-33782
Skylab 4 crew observations
N77-33783
Skylab 2 crew observations and summary
N77-33784
Skylab oral health studies
N77-33786
Skylab environmental and crew microbiology studies
N77-33788
Radiological protection and medical dosimetry for the Skylab crewmen
N77-33789
BIOMETRICS
Translations on USSR science and technology biomedical sciences, no. 12
[JPRS-70017] N77-33844
BIONICS
The proprioceptive contour as a linearizer of the eye movement system
A77-50806
BIOSATELLITES
Some results of biological investigations aboard the biosatellite Cosmos-782
[IAF PAPER 77-262] A77-51502
BIOTELEMETRY
The problem of constructing bioamplifiers for dynamic biotelemetry studies
A77-50909
Retention of selected physiological indicators in pilots in the course of agricultural flights
[NASA-TT-F-17441] N77-33845
BLOOD
Renin, aldosterone, electrolyte, and cortisol responses to hypoxic decompression
A77-49261
Influence of temperature on hemoglobin-ligand interaction in whole blood
A77-49263
Reparative processes in spleen and peripheral blood after the outset of continuous irradiation
[IAF PAPER 77-266] A77-51506
Fluid dynamics of blood cells and applications to hemodialysis
[PB-268346/4] N77-32713
Fluid dynamics of blood cells and applications to hemodialysis
[PB-268420/7] N77-32714
A.I.e. in-flight blood collection system
N77-33825
BLOOD FLOW
A model study of stroke values calculated from impedance and their relation to the waveform of blood flow
A77-49275
Fluid dynamics of blood cells and applications to hemodialysis
[PB-268346/4] N77-32713
Fluid dynamics of blood cells and applications to hemodialysis
[PB-268420/7] N77-32714
BLOOD PLASMA
Effect of heparin-induced free fatty acid elevation on myocardial oxygen consumption in man
A77-48481
Acid-base equilibrium of rat blood during the combined action of hypercapnia, hypoxia and cooling
A77-50748
Plasma and tissue lipid changes in rats irradiated in cosmic space
[IAF PAPER 77-263] A77-51503
BLOOD PRESSURE
Hemodynamics in the case of combining nociceptive stimulation with stimulation of the amygdaloid complex after acting upon the sensorimotor region of the cortex
A77-50746
Automatic blood pressure measuring system (M092)
N77-33823
BLOOD VESSELS
Age-related changes in the mucopolysaccharide content in human coronary-artery walls
A77-49472
BLOOD VOLUME
Blood volume changes
N77-33806
Automatic blood pressure measuring system (M091)
N77-33822
BODY FLUIDS
Biostereometric analysis of body form
N77-33802
BODY KINEMATICS
Rotational motion of an astronaut's trunk --- body attitude change by arm and leg motions in weightlessness
A77-50308
BODY TEMPERATURE
Body temperature measuring system (M171)
N77-33828
BODY VOLUME (BIOLOGY)
Biostereometric analysis of body form
N77-33802
BODY WEIGHT
Physiological mass measurements in Skylab
N77-33799
BONE DEMINERALIZATION
Marginal alveolar bone loss in flying personnel - A radiographical followup study
A77-49827
Bone mineral measurement: Experiment M078
N77-33800
BONE MARROW
Reparative processes in spleen and peripheral blood after the outset of continuous irradiation
[IAF PAPER 77-266] A77-51506
BONE MINERAL CONTENT
Investigate methods for measuring muscle and bone mass changes in astronauts and animals which occur during space flight
[NASA-CR-151518] N77-33837
BRAIN CIRCULATION
Correlation between ventilatory and cerebrovascular responses to inhalation of CO
A77-49262
BRAIN DAMAGE
Origins of serotonin innervation of forebrain structures
A77-51617
BREATHING APPARATUS
The use of n-pentane as a tracer gas for the quantitative evaluation of aircrew protective breathing equipment
A77-49929
BUILDINGS
Concepts for the generation, communication, and evaluation of habitability criteria
[AD-A041187] N77-32724
BURNS (INJURIES)
Medical investigation of fatalities from aircraft-accident burns
A77-50760

C

CABIN ATMOSPHERES
Problems of ecological psychology during prolonged stay in sealed chambers
[IAF PAPER 77-244] A77-51495
Atmospheric analyzer, carbon monoxide monitor and toluene diisocyanate monitor
N77-33834
CALIBRATING
Distortion of non-invasive cardiac pulse curves - A capillary-damped pick-up and a calibration unit for apex cardiograms and other pulse curves
A77-48418

CANOPIES
Computing internal cockpit reflections of external point-light sources for the Model 209 Ah-1-S helicopter flat-plate canopy design
[AD-A043120] N77-32727
Investigation of inside light reflection problem on the Flat Plate Canopy (FPC) for model 209 AH-IS helicopter
[AD-A041332] N77-33858
CAPILLARIES (ANATOMY)
Distortion of non-invasive cardiac pulse curves - A capillary-damped pick-up and a calibration unit for apex cardiograms and other pulse curves
A77-48418
CARBOHYDRATE METABOLISM
Effect of space flight factors on glycogen metabolic system and on ionic composition of rat skeletal muscle
[IAF PAPER 77-264] A77-51504
The effect of prolonged space flight on liver enzyme activities and on lipogenesis in adipose tissue of rats
[IAF PAPER 77-267] A77-51507
CARBON DIOXIDE
Carbon dioxide/dewpoint monitor
N77-33833
CARBON DIOXIDE CONCENTRATION
Acid-base equilibrium of rat blood during the combined action of hypercapnia, hypoxia and cooling
A77-50748
CARBON DIOXIDE REMOVAL
Regenerable device for scrubbing breathable air of CO2 and moisture without special heat exchanger equipment
[NASA-CASE-MSC-14771-1] N77-32722
CARBON MONOXIDE
Correlation between ventilatory and cerebrovascular responses to inhalation of CO
A77-49262
Toxicological aspects of the Skylab program
N77-33790
Atmospheric analyzer, carbon monoxide monitor and toluene diisocyanate monitor
N77-33834
CARBON MONOXIDE POISONING
Studies on the relation between carboxyhemoglobin concentration and toxicity --- for aircraft accident victims
A77-50761
CARBOXYHEMOGLOBIN
Correlation between ventilatory and cerebrovascular responses to inhalation of CO
A77-49262
Studies on the relation between carboxyhemoglobin concentration and toxicity --- for aircraft accident victims
A77-50761
CARDIAC VENTRICLES
Finite element stress analysis of the human left ventricle whose irregular shape is developed from single plane cineangiocardiogram
A77-51260
CARDIOGRAPHY
An acoustic transducer for application in kinetocardiography
A77-49274
CARDIOVASCULAR SYSTEM
A model study of stroke values calculated from impedance and their relation to the waveform of blood flow
A77-49275
The functional state of the cardiovascular system with sinocarotid reflex
A77-49445
Influence of water temperature on thermal, circulatory and respiratory responses to muscular work
A77-49923
Cardiorespiratory responses to exercise after bed rest in men and women
A77-50444
Evaluation of the electromechanical properties of the cardiovascular system after prolonged weightlessness
N77-33814
Response of the cardiovascular system to vibration and combined stresses
[AD-A039000] N77-33848
CAROTID SINUS REFLEX
The functional state of the cardiovascular system with sinocarotid reflex
A77-49445
CELLS (BIOLOGY)
Cerebellar dynamics - The mossy fiber input --- neurophysiological model
A77-49272
CENTRIFUGING STRESS
Ontogenetic features of the reaction of adrenergic systems to hypergravity
A77-48479
Femoral development in chronically centrifuged rats
A77-49832
CERAMICS
Development of a helmet-mounted PLZT thermal/flash protection system --- Polycrystalline Lead Zirconate Titanate ceramics
A77-49943
CEREBELLUM
Quantitative histochemistry of the vestibular cerebellum of the fish Fundulus heteroclitus flown aboard the biosatellite Cosmos-782
A77-49828
Hemodynamics in the case of combining nociceptive stimulation with stimulation of the amygdaloid complex after acting upon the sensorimotor region of the cortex
A77-50746
CEREBRAL CORTEX
Cerebellar dynamics - The mossy fiber input --- neurophysiological model
A77-49272
CEREBRAL VASCULAR ACCIDENTS
Correlation between ventilatory and cerebrovascular responses to inhalation of CO
A77-49262
CHEMICAL EVOLUTION
Chlorophyll derivatives in modern soils in relation to the problem of the chemical evolution and origin of life on earth
A77-48034
CHEST
Automated chest X-ray analysis
[LA-UR-77-532] N77-33851
CHLOROPHYLLS
Chlorophyll derivatives in modern soils in relation to the problem of the chemical evolution and origin of life on earth
A77-48034
CHROMOSOMES
Cytogenetic studies of blood, experiment M111
N77-33804
CIRCADIAN RHYTHMS
Current problems in space biorhythmology --- Russian book
A77-50686
CIVIL AVIATION
Continuous ECG monitoring on civil air crews during flight operations
A77-49838
CLINICAL MEDICINE
Some aspects of the clinical training of aviation physicians
A77-48461
Local features in the lung of healthy subjects and in pulmonary pathology
A77-49438
CLOSED ECOLOGICAL SYSTEMS
Problems of ecological psychology during prolonged stay in sealed chambers
[IAF PAPER 77-244] A77-51495
Regenerable device for scrubbing breathable air of CO2 and moisture without special heat exchanger equipment
[NASA-CASE-MSC-14771-1] N77-32722
COCKPITS
Computing internal cockpit reflections of external point-light sources for the Model 209 Ah-1-S helicopter flat-plate canopy design
[AD-A043120] N77-32727
Investigation of inside light reflection problem on the Flat Plate Canopy (FPC) for model 209 AH-IS helicopter
[AD-A041332] N77-33858
COLD TOLERANCE
The Arctic personnel ambulatory anti-exposure system
A77-49939

Acid-base equilibrium of rat blood during the combined action of hypercapnia, hypoxia and cooling
A77-50748

COLLECTION
A.I.e. in-flight blood collection system
N77-33825

COLOR VISION
Evaluation of single-pigment shift model of anomalous trichromacy
A77-49308

COMBUSTION PRODUCTS
Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system
A77-50631
Effect of ammonia on Swiss albino mice
A77-50635
A review of available LC/50/ data --- on toxic gases encountered in fires
A77-50638

COMFORT
Some influences of restraint harness design on accident pathology
A77-50751

COMMERCIAL AIRCRAFT
Emergency medical kits aboard aircraft
A77-49840

COMPENSATORY TRACKING
The relationship between physiological parameters and performance in a compensatory tracking test to determine aptitude
A77-49924

COMPRESSED GAS
Biological effect of fire suppression by nitrogen pressurization in enclosed environments
A77-50630

COMPUTER ASSISTED INSTRUCTION
Flexilevel adaptive testing paradigm: Validation in technical training
[AD-A042977] N77-32718

COMPUTER PROGRAMS
Finite element stress analysis of the human left ventricle whose irregular shape is developed from single plane cineangiocardiogram
A77-51260
PROMETHEUS 2: A user oriented program for human crash dynamics
[PB-269305/9] N77-33866

COMPUTER SYSTEMS DESIGN
Automated chest X-ray analysis
[LA-UR-77-532] N77-33851
Interactive system design considerations
[PU182/76] N77-33863

COMPUTER TECHNIQUES
The controller and automation --- computerized air traffic control
A77-49223
A computer controlled method for determining the fields of visual system neurons
A77-49273

COMPUTERIZED SIMULATION
A model study of stroke values calculated from impedance and their relation to the waveform of blood flow
A77-49275

CONFERENCES
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI annual meeting, volume 1
[PB-268094/0] N77-32712
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI Annual Meeting, volume 2
[PB-268095/7] N77-33853

CONSOLES
Improved seat, console, and workplace design: Annotated bibliography, integration of the literature, accommodation model, and seated operator reach profiles
[AD-A040479] N77-33857

CONSTRUCTION
Guidebook on anthroposorphic test dummy usage
[PB-268908/0] N77-33865

CONTROL EQUIPMENT
Anthroposorphic master/slave manipulator system
[NASA-CASE-ARC-10756-1] N77-32721

CORIOLIS EFFECT
The ability to endure Coriolis force and some questions of vestibular choice
A77-50923

CORONARY ARTERY DISEASE
Age-related changes in the mucopolysaccharide content in human coronary-artery walls
A77-49472
Ischaemic heart disease - A problem in aircraft accident reconstruction
A77-50759

CORONARY CIRCULATION
Effect of heparin-induced free fatty acid elevation on myocardial oxygen consumption in man
A77-48481
Some problems in cardiac electrokymography
A77-49446

COSMOS SATELLITES
Some results of biological investigations aboard the biosatellite Cosmos-782
[IAF PAPER 77-262] A77-51502

COSMOS 782 SATELLITE
Quantitative histochemistry of the vestibular cerebellua of the fish Fundulus heteroclitus flown aboard the biosatellite Cosmos-782
A77-49828

COST ANALYSIS
Impact of noise control at the workplace. Volumes 1 and 2, appendices A-G and volume 3, appendices H and I (econometric simulation)
[PB-268231/8] N77-32716

CRASH INJURIES
Cause of death in aircraft accidents - Drowning vs. traumatic injuries
A77-50753
Medical investigation of fatalities from aircraft-accident burns
A77-50760

CUES
Effects of visual propioceptive cue conflicts on human tracking performance
[AD-A042006] N77-33860

CUSHIONS
Pulsating seat cushion evaluation
A77-49940

CYTOLOGY
Ultrastructural changes in tracheal epithelial cells exposed to oxygen
A77-49829
The response of single human bells to zero-gravity
N77-33805

D

DATA ACQUISITION
Response surface methodology revisited: A commentary on research strategy
[AD-A043242] N77-32726

DATA BASES
Development of an objective definition of habitability and a habitability data base
[AD-A041188] N77-32725

DATA MANAGEMENT
The controller and automation --- computerized air traffic control
A77-49223

DECOMPRESSION SICKNESS
Renin, aldosterone, electrolyte, and cortisol responses to hypoxic decompression
A77-49261
The probability of decompression sickness as a result of going out in a pressure suit from a spacecraft with an atmosphere close to that on earth
[IAF PAPER A-77-41] A77-51519

DEGENERATION
Study of metabolism and energetics in hypogravity: Degenerative effects of prolonged hypogravity
[NASA-CR-155199] N77-33839

DENTAL CALCULI
Skylab oral health studies
N77-33786

DENTISTRY
Marginal alveolar bone loss in flying personnel - A radiographical followup study
A77-49827

DEOXYRIBONUCLEIC ACID
Influence of irradiation and space flight factors of nucleic acids and deoxyribonucleoprotein in liver and spleen of rat
[IAF PAPER 77-265] A77-51505
DEPLOYMENT
Design and development of the Irvin 'Hitefinder' Automatic Parachute Ripcord Release
A77-49944
DEW
Carbon dioxide/dewpoint monitor
N77-33833
DIAGNOSIS
The exercise electrocardiogram in diagnosis
A77-49182
Local features in the lung of healthy subjects and in pulmonary pathology
A77-49438
DIALYSIS
Fluid dynamics of blood cells and applications to hemodialysis
[PB-268346/4] N77-32713
DIETS
Characteristics of fatty acid metabolism in mammals during fasting
A77-49372
DIGESTIVE SYSTEM
Activity of the digestive system during 49-day antiorthostatic human hypokinesia
[NASA-TM-75177] N77-33846
DISEASES
Previous disease in aircrew killed in flying accidents
A77-50755
DISPLAY DEVICES
Disorienting effects of aircraft catapult launchings. III - Cockpit displays and piloting performance
A77-49826
Effect of virtual image projection distance on the accommodative response of the eye
A77-49830
A review of the literature on the legibility of alphanumerics on electronic displays
[AD-A040625] N77-33856
DOGS
Fluid dynamics of blood cells and applications to hemodialysis
[PB-268420/7] N77-32714
DUMMIES
Guidebook on anthropomorphic test dummy usage
[PB-268904/0] N77-33865
DYNAMIC MODELS
The proprioceptive contour as a linearizer of the eye movement system
A77-50806
DYNAMIC RESPONSE
PROMETHEUS 2: A user oriented program for human crash dynamics
[PB-269305/9] N77-33866

E

EAR PROTECTORS
Noise induced hearing loss. Noise evaluation. The use of hearing protectors
[NTNF-4] N77-33852
EARTH ATMOSPHERE
The probability of decompression sickness as a result of going out in a pressure suit from a spacecraft with an atmosphere close to that on earth
[IAF PAPER A-77-41] A77-51519
ECOLOGY
Ecological aspects of respiratory physiology and hereditary variations in reactivity
A77-49437
EDUCATION
Some aspects of the clinical training of aviation physicians
A77-48461
Flexilevel adaptive testing paradigm: Validation in technical training
[AD-A042977] N77-32718
EFFLUENTS
The use of a behavioral response system in the USF/NASA toxicity screening test method
A77-50627
EJECTION SEATS
Pulsating seat cushion evaluation
A77-49940
ELECTRIC ARCS
Evaluation of the potential retinal hazards from optical radiation generated by electric welding and cutting ARCS
[AD-A043023] N77-32710
ELECTRIC DISCHARGES
Functional relation between the spectrum of atmospheric electrical discharges and biological activity of living organisms
A77-49468
ELECTRIC POWER TRANSMISSION
Experiment support system
N77-33831
ELECTRIC STIMULI
Hemodynamics in the case of combining nociceptive stimulation with stimulation of the amygdaloid complex after acting upon the sensorimotor region of the cortex
A77-50746
ELECTRICAL IMPEDANCE
A model study of stroke values calculated from impedance and their relation to the waveform of blood flow
A77-49275
An electrode system for tetrapolar electrical impedance plethysmography of the finger
A77-51616
ELECTROCARDIOGRAPHY
Distortion of non-invasive cardiac pulse curves - A capillary-damped pick-up and a calibration unit for apex cardiograms and other pulse curves
A77-48418
The exercise electrocardiogram in diagnosis
A77-49182
The functional state of the cardiovascular system with sinocarotid reflex
A77-49445
Continuous ECG monitoring on civil air crews during flight operations
A77-49838
ELECTRODES
An electrode system for tetrapolar electrical impedance plethysmography of the finger
A77-51616
ELECTROLYTE METABOLISM
On the possibilities of prediction of differences in radiation resistance of individuals
[IAF PAPER 77-250] A77-51498
ELECTROMAGNETIC ABSORPTION
Internal EM field and absorbed power density in human torsos induced by 1-500-MHz EM waves
A77-49504
ELECTROMAGNETIC RADIATION
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI annual meeting, volume 1
[PB-268094/0] N77-32712
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI Annual Meeting, volume 2
[PB-268095/7] N77-33853
ELECTROMECHANICS
Evaluation of the electromechanical properties of the cardiovascular system after prolonged weightlessness
N77-33814
ELECTROMYOGRAPHY
Muscular control during some voluntary motions with one degree of freedom. II - Multiple motions
A77-48320
ELECTRON MICROSCOPY
Ultrastructural changes in tracheal epithelial cells exposed to oxygen
A77-49829
ELECTROPHYSIOLOGY
A computer controlled method for determining the fields of visual system neurons
A77-49273
ELECTROPLETHYSMOGRAPHY
Mechanisms for the formation of rheoophthalograms and electroplethysmograms of the eye
A77-50745
EMERGENCY LIFE SUSTAINING SYSTEMS
The Arctic personnel ambulatory anti-exposure system
A77-49939

Design and development of the Irvin 'Hitefinder' Automatic Parachute Ripcord Release
A77-49944

EMOTIONAL FACTORS
Effect of emotional stress on recognition of visual patterns
A77-49835

ENDOCRINE GLANDS
The functional state of the hypothalamus-pituitary-adrenal cortex system as a criterion for setting a standard for microwave radiation
A77-50922

ENVIRONMENT EFFECTS
Ecological aspects of respiratory physiology and hereditary variations in reactivity
A77-49437
Biological effect of fire suppression by nitrogen pressurization in enclosed environments
A77-50630
Mean skin temperature weighted with both ratios of heat transfer coefficient and body surface area --- human body-environment interactions
A77-51215

ENVIRONMENTAL TESTS
The use of a behavioral response system in the USP/NASA toxicity screening test method
A77-50627

ENZYME ACTIVITY
The effect of prolonged space flight on liver enzyme activities and on lipogenesis in adipose tissue of rats
[IAF PAPER 77-267] A77-51507
Origins of serotonin innervation of forebrain structures
A77-51617

EPITHELIUM
Ultrastructural changes in tracheal epithelial cells exposed to oxygen
A77-49829

ERGOMETERS
Ergometer
N77-33826

ERYTHROCYTES
Some aspects of energy metabolism in human blood erythrocytes under hypokinesia and during space flights
A77-49831
Blood volume changes
N77-33806
Red cell metabolism studies on Skylab
N77-33807

ESCAPE SYSTEMS
Bibliography of research reports and publications: Impact, vibration, windblast and escape, 1942 - 1976
[AD-A042201] N77-33850

EXOBIOLOGY
Plasma and tissue lipid changes in rats irradiated in cosmic space
[IAF PAPER 77-263] A77-51503
Space Biology and Aerospace Medicine, no. 4, 1977
[JPRS-69964] N77-33843

EXPERIMENTAL DESIGN
Mechanized experiment planning in automaton-environment systems
A77-49335
Experimental designs and psychometric techniques for the study of ride quality
[PB-268584/0] N77-32729

EXPERIMENTATION
Skylab medical program overview
N77-33781
Flight control experiences
N77-33782

EXTRAVEHICULAR ACTIVITY
Metabolic cost of extravehicular activities
N77-33818

EYE (ANATOMY)
Mechanisms for the formation of theoophthalograms and electroplethysmograms of the eye
A77-50745

EYE MOVEMENTS
The proprioceptive contour as a linearizer of the eye movement system
A77-50806

EYE PROTECTION
Development of a helmet-mounted PLZT thermal/flash protection system --- Polycrystalline Lead Zirconate Titanate ceramics
A77-49943

F

FABRICS
Double knit aramid flight suits for aircrewmen
A77-49938

FAIL-SAFE SYSTEMS
Design and development of the Irvin 'Hitefinder' Automatic Parachute Ripcord Release
A77-49944

FAILURE ANALYSIS
Crew behavior in accident causation --- pilot as information processor
A77-50752

FATTY ACIDS
Effect of heparin-induced free fatty acid elevation on myocardial oxygen consumption in man
A77-48481
Characteristics of fatty acid metabolism in mammals during fasting
A77-49372

FEASIBILITY ANALYSIS
Feasibility study on the design of a probe for rectal cancer detection
[NASA-CR-155043] N77-32708

FEEDBACK CONTROL
Effect of postsynaptic factors on presynaptic nerve endings /functional feedbacks in the synapse/
A77-49370

FEET (ANATOMY)
Changes in the Achilles tendon reflexes following Skylab missions
N77-33795

FEMUR
Femoral development in chronically centrifuged rats
A77-49832

FINGERS
Evaluation and disposition of Army helicopter aviators with finger amputations
A77-50756
An electrode system for tetrapolar electrical impedance plethysmography of the finger
A77-51616

FINITE ELEMENT METHOD
Finite element stress analysis of the human left ventricle whose irregular shape is developed from single plane cineangiocardiogram
A77-51260

FIRE EXTINGUISHERS
Biological effect of fire suppression by nitrogen pressurization in enclosed environments
A77-50630

FIRES
Human behavior in institutional fires and its design implications
[NBS-GCR-77-93] N77-33854

FIRST AID
Emergency medical kits aboard aircraft
A77-49840

FLASH
Visual light flash observations on Skylab 4
N77-33794

FLIGHT CLOTHING
Double knit aramid flight suits for aircrewmen
A77-49938
USAFSAM evaluation of the Sierra Lightweight Helmet
A77-49952

FLIGHT CREWS
Operational requirements for aircrew antiexposure suits in the U.S. Navy
A77-49937
Crew behavior in accident causation --- pilot as information processor
A77-50752
Previous disease in aircrew killed in flying accidents
A77-50755

FLIGHT FITNESS
The ability to endure Coriolis force and some questions of vestibular choice
A77-50923

Repeated examination in a low-pressure chamber of pilots with reduced ability to endure hypoxia
A77-50924

FLIGHT SAFETY
The significance of a psychophysiological norm for flying time for the medical safeguarding of flights
A77-48463
Design and development of the Irvin 'Hitefinder' Automatic Parachute Ripcord Release
A77-49944

FLIGHT SIMULATORS
The effects of system and environmental factors upon experienced pilot performance in the advanced simulator for pilot training
[AD-A043195] N77-32717
Engineering and geographic constraints of a six degree of freedom synergistic platform motion system
[AD-A043194] N77-32728
Vestibular-visual interactions in flight simulators
[NASA-CR-155200] N77-33847

FLIGHT TESTS
Continuous ECG monitoring on civil air crews during flight operations
A77-49838

FLIGHT TIME
The significance of a psychophysiological norm for flying time for the medical safeguarding of flights
A77-48463

FLIGHT TRAINING
The effects of system and environmental factors upon experienced pilot performance in the advanced simulator for pilot training
[AD-A043195] N77-32717
Engineering and geographic constraints of a six degree of freedom synergistic platform motion system
[AD-A043194] N77-32728

FLIGHT VEHICLES
A review of methods for estimation of aeroacoustic loads on flight vehicle surface, volume 2
[AD-A042783] N77-32720

FLUID DYNAMICS
Fluid dynamics of blood cells and applications to hemodialysis
[PB-268346/4] N77-32713
Fluid dynamics of blood cells and applications to hemodialysis
[PB-268420/7] N77-32714

FLUID FLOW
Anthropometric changes and fluid shifts
N77-33812

FLYING PERSONNEL
Marginal alveolar bone loss in flying personnel - A radiographical followup study
A77-49827

FOVEA
Stereo acuity and reconnaissance. Phase 2: Development of a Foveal-Parafoveal chromostereopsis test
[AD-A043258] N77-32719

FRAGMENTATION
Laboratory examination of unidentified suspected tissue fragments found at aircraft sites
A77-50754

FREE FALL
Design and development of the Irvin 'Hitefinder' Automatic Parachute Ripcord Release
A77-49944

GAMMA RAY ABSORPTIOMETRY
Bone mineral measurement: Experiment M078
N77-33800

GAMMA RAYS
Reparative processes in spleen and peripheral blood after the outset of continuous irradiation
[IAF PAPER 77-266] A77-51506

GAS ANALYSIS
Use of a GL-5118 gas analyzer to measure the amount of oxygen consumption under conditions of increased pressure of the gaseous medium
A77-50750

GAS CHROMATOGRAPHY
The use of n-pentane as a tracer gas for the quantitative evaluation of aircrew protective breathing equipment
A77-49929

GAS DENSITY
Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-O2 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/
A77-49834

GERMANY
Reports from the German meteorological service. Volume 18, no. 142: The weather dependent yield of some shortliving food plants
[ISBN-3-88148-125-7] N77-32707

GLYCOGENS
Effect of space flight factors on glycogen metabolic system and on ionic composition of rat skeletal muscle
[IAF PAPER 77-264] A77-51504

GLYCOLYSIS
Some aspects of energy metabolism in human blood erythrocytes under hypokinesia and during space flights
A77-49831

GOGGLES
The objective evaluation of aircrew protective breathing equipment. I - Oxygen mask/goggles combinations. II - Pullface masks and hoods
A77-49927
Development of a helmet-mounted PLZT thermal/flash protection system --- Polycrystalline Lead Zirconate Titanate ceramics
A77-49943

GRAVITATION
Higher plant metabolism and energetics in hypogravity: Amino acid metabolism in higher plants
[NASA-CR-155198] N77-33840

GRAVITATIONAL EFFECTS
Femoral development in chronically centrifuged rats
A77-49832
Experiment M131. Human vestibular function
N77-33791
The effects of prolonged exposure to weightlessness on postural equilibrium
N77-33792
Study of metabolism and energetics in hypogravity: Degenerative effects of prolonged hypogravity
[NASA-CR-155199] N77-33839

GROUP DYNAMICS
Crew behavior in accident causation --- pilot as information processor
A77-50752

H

HABITABILITY
Concepts for the generation, communication, and evaluation of habitability criteria
[AD-A041187] N77-32724
Development of an objective definition of habitability and a habitability data base
[AD-A041188] N77-32725

HAND (ANATOMY)
Compact artificial hand
[NASA-CASE-NPO-13906-1] N77-32723

HARNESSES
Some influences of restraint harness design on accident pathology
A77-50751

HAZARDS
Some test results on the visibility of obstacle and hazard beacons
[DLR-IB-553-76/5] N77-33862

HEAD-UP DISPLAYS
The VTAS/helmet interface --- Visual Target Acquisition Set
A77-49941

HEALTH PHYSICS
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI Annual Meeting, volume 2
[PB-268095/7] N77-33853

HEART
Determination of cardiac size from chest roentgenograms following Skylab missions
N77-33819

HEART DISEASES
The exercise electrocardiogram in diagnosis
A77-49182
Continuous ECG monitoring on civil air crews during flight operations
A77-49838
Sarcoid and the heart - An aeromedical risk
A77-50758
HEART FUNCTION
A model study of stroke values calculated from impedance and their relation to the waveform of blood flow
A77-49275
Some problems in cardiac electrokymography
A77-49446
Energetics of the heart during hypothermia
A77-50747
Estimate of the perceptive load by variability of rate of heartbeat
[AD-A042495] N77-32709
Effect of prolonged space flight on cardiac function and dimensions
N77-33815
Lower body negative pressure device
N77-33821
HEART RATE
Recovery from exercise at varying work loads - Time course of responses of heart rate and systolic intervals
A77-48417
HEAT ACCLIMATIZATION
Exercise and heat orthostatism and the effect of heat acclimation and physical fitness
A77-49833
HEAT TRANSFER COEFFICIENTS
Mean skin temperature weighted with both ratios of heat transfer coefficient and body surface area --- human body-environment interactions
A77-51215
HEAVY ELEMENTS
Toxicology of metals, volume 2
[PB-268324/1] N77-32715
HELICOPTERS
Investigation of inside light reflection problem on the Flat Plate Canopy (FPC) for model 209 AH-1S helicopter
[AD-A041332] N77-33858
The maximum detection range and the maximum recognition distance when observing ground targets from helicopters
[DLR-IB-553-76/3] N77-33861
HELIUM-OXYGEN ATMOSPHERES
Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-O2 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/
A77-49834
HELMETS
The VTAS/helmet interface --- Visual Target Acquisition Set
A77-49941
Human compatibility testing of the RAF P/Q oxygen mask with the USAF HGU-2A/P flying helmet
A77-49942
Development of a helmet-mounted PLZT thermal/flash protection system --- Polycrystalline Lead Zirconate Titanate ceramics
A77-49943
USAFSAM evaluation of the Sierra Lightweight Helmet
A77-49952
The helmet protects the aviator's head - Or does it
A77-50660
HEMATOLOGY
Hematology and immunology studies
N77-33808
HEMODYNAMIC RESPONSES
Hemodynamic studies of the legs under weightlessness
N77-33811
HEMODYNAMICS
Some problems in cardiac electrokymography
A77-49446
Mechanisms for the formation of rheoophthalograms and electroplethysmograms of the eye
A77-50745
Hemodynamics in the case of combining nociceptive stimulation with stimulation of the amygdaloid complex after acting upon the sensorimotor region of the cortex
A77-50746
HEMOGLOBIN
Influence of temperature on hemoglobin-ligand interaction in whole blood
A77-49263
HEPARINS
Effect of heparin-induced free fatty acid elevation on myocardial oxygen consumption in man
A77-48481
HIGH ALTITUDE ENVIRONMENTS
Hormonal changes under altitude stress
A77-47991
Renin, aldosterone, electrolyte, and cortisol responses to hypoxic decompression
A77-49261
HIGH GRAVITY ENVIRONMENTS
Ontogenetic features of the reaction of adrenergic systems to hypergravity
A77-48479
HIGH PRESSURE
Use of a GL-5118 gas analyzer to measure the amount of oxygen consumption under conditions of increased pressure of the gaseous medium
A77-50750
HISTOCHEMICAL ANALYSIS
Morphological and histochemical indices of compensatory adaptations in organs in response to oxygen insufficiency
A77-49444
Quantitative histochemistry of the vestibular cerebellum of the fish Fundulus heteroclitus flown aboard the biosatellite Cosmos-782
A77-49828
HISTOLOGY
Femoral development in chronically centrifuged rats
A77-49832
HORMONE METABOLISMS
Hormonal changes under altitude stress
A77-47991
On the possibilities of prediction of differences in radiation resistance of individuals
[IAF PAPER 77-250] A77-51498
HORMONES
The functional state of the hypothalamus-pituitary-adrenal cortex system as a criterion for setting a standard for microwave radiation
A77-50922
HUMAN BEHAVIOR
Learning process and nonlinear behavior of human operators in stabilizing unstable systems
A77-48491
Crew behavior in accident causation --- pilot as information processor
A77-50752
Human behavior in institutional fires and its design implications
[NBS-GCR-77-93] N77-33854
HUMAN BODY
Internal EM field and absorbed power density in human torsos induced by 1-500-MHz EM waves
A77-49504
Rotational motion of an astronaut's trunk --- body attitude change by arm and leg motions in weightlessness
A77-50308
HUMAN FACTORS ENGINEERING
Operational requirements for aircrew antiexposure suits in the U.S. Navy
A77-49937
Double knit aramid flight suits for aircrewmen
A77-49938
Pulsating seat cushion evaluation
A77-49940
Human compatibility testing of the RAF P/Q oxygen mask with the USAF HGU-2A/P flying helmet
A77-49942
Some influences of restraint harness design on accident pathology
A77-50751
Concepts for the generation, communication, and evaluation of habitability criteria
[AD-A041187] N77-32724
Development of an objective definition of habitability and a habitability data base
[AD-A041188] N77-32725
Response surface methodology revisited: A commentary on research strategy
[AD-A043242] N77-32726

Computing internal cockpit reflections of external point-light sources for the Model 209 Ah-1-S helicopter flat-plate canopy design
[AD-A043120] N77-32727
Psychometric characteristics of astronauts
[AD-A039228] N77-33855
Improved seat, console, and workplace design: Annotated bibliography, integration of the literature, accommodation model, and seated operator reach profiles
[AD-A040879] N77-33857
A spatial frequency analysis model for predicting human performance at visual pattern matching tasks
[AD-A041649] N77-33859

HUMAN PATHOLOGY
Some influences of restraint harness design on accident pathology
A77-50751
Cause of death in aircraft accidents - Drowning vs. traumatic injuries
A77-50753
Laboratory examination of unidentified suspected tissue fragments found at aircraft sites
A77-50754
Previous disease in aircrew killed in flying accidents
A77-50755
Sarcoidosis - A review of some features of importance in aviation medicine
A77-50757
Medical investigation of fatalities from aircraft-accident burns
A77-50760

HUMAN PERFORMANCE
Lung capacities of healthy subjects of different ages
A77-49439
The human operator in the search situation --- pattern recognition problems
A77-49673
The relationship between physiological parameters and performance in a compensatory tracking test to determine aptitude
A77-49924
Problems of ecological psychology during prolonged stay in sealed chambers
[IAF PAPER 77-204] A77-51495
Task and work performance on Skylab missions 2, 3, and 4: Time and motion study: Experiment M151
N77-33796
Neurophysiological estimates of human performance capabilities in aerospace systems
[AD-A038208] N77-33849

HUMAN REACTIONS
Hormonal changes under altitude stress
A77-47991
The functional state of an organism subjected to general low-frequency vibrations and impact acceleration
A77-48462
Ecological aspects of respiratory physiology and hereditary variations in reactivity
A77-49437
Assessing the discomfort of dual-axis whole-body vibration
A77-50196
Mean skin temperature weighted with both ratios of heat transfer coefficient and body surface area --- human body-environment interactions
A77-51215
Response surface methodology revisited: A commentary on research strategy
[AD-A043242] N77-32726
PROMETHEUS 2: A user oriented program for human crash dynamics
[PB-269305/9] N77-33866

HUMAN TOLERANCES
Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-O2 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/
A77-49834
Lower body negative pressure: Third manned Skylab mission
N77-33809

HYPERBARIC CHAMBERS
Efficiency of the oxygen mask delivery system at the USAF hyperbaric center
A77-49928

HYPERCAPNIA
Acid-base equilibrium of rat blood during the combined action of hypercapnia, hypoxia and cooling
A77-50748
Functional changes in the respiratory system of dogs in the case of alveolar hypoxia with hypercapnia
A77-50749

HYPEROXIA
Age differences in human external respiration response to hyperoxic and hypoxic gas mixtures
A77-49440

HYPOBARIC ATMOSPHERES
Repeated examination in a low-pressure chamber of pilots with reduced ability to endure hypoxia
A77-50924

HYPOKINESIA
The effect of prolonged hypokinesis on the function of the auditory analyzer
A77-48464
Some aspects of energy metabolism in human blood erythrocytes under hypokinesia and during space flights
A77-49831
Pulsating seat cushion evaluation
A77-49940
Activity of the digestive system during 49-day antiorthostatic human hypokinesia
[NASA-TM-75177] N77-33846

HYPOMETABOLISM
Higher plant metabolism and energetics in hypogravity: Amino acid metabolism in higher plants
[NASA-CR-155198] N77-33840

HYPOTHALAMUS
The functional state of the hypothalamus-pituitary-adrenal cortex system as a criterion for setting a standard for microwave radiation
A77-50922

HYPOTHERMIA
Energetics of the heart during hypothermia
A77-50747

HYPOXEMIA
Renin, aldosterone, electrolyte, and cortisol responses to hypoxic decompression
A77-49261

HYPOXIA
Correlation between ventilatory and cerebrovascular responses to inhalation of CO
A77-49262
Age differences in human external respiration response to hyperoxic and hypoxic gas mixtures
A77-49440
Tissue respiration features in white rats exhibiting high and low resistance to hypoxia
A77-49443
Morphological and histochemical indices of compensatory adaptations in organs in response to oxygen insufficiency
A77-49444
Acid-base equilibrium of rat blood during the combined action of hypercapnia, hypoxia and cooling
A77-50748
Functional changes in the respiratory system of dogs in the case of alveolar hypoxia with hypercapnia
A77-50749
Repeated examination in a low-pressure chamber of pilots with reduced ability to endure hypoxia
A77-50924

I

ILLUSIONS
Antisomatogyral illusion --- perceived motion reversal after bodily rotation
A77-49836

IMAGING TECHNIQUES
Effect of virtual image projection distance on the accommodative response of the eye
A77-49830

IMMUNOLOGY
Hematology and immunology studies
N77-33808

IMPACT ACCELERATION
The functional state of an organism subjected to general low-frequency vibrations and impact acceleration
A77-48462
IMPACT TESTS
Guidebook on anthropomorphic test dummy usage
[PB-268904/0] N77-33865
IMPACT TOLERANCES
Tolerance and response of the knee-femur-pelvis complex to axial impact
[PB-269059/2] N77-33864
IN-FLIGHT MONITORING
Experiment M133. Sleep monitoring on Skylab
N77-33793
Biochemical responses of the Skylab crewmen: An overview
N77-33803
A.I.e. in-flight blood collection system
N77-33825
Body temperature measuring system (M171)
N77-33828
Hardware report for experiment M133, sleep monitoring on Skylab
N77-33829
In-flight medical support system
N77-33832
Carbon dioxide/dewpoint monitor
N77-33833
INDUSTRIAL SAFETY
Impact of noise control at the workplace. Volumes 1 and 2, appendices A-G and volume 3, appendices H and I (econometric simulation)
[PB-268231/8] N77-32716
Translations on USSR science and technology biomedical sciences, no. 12
[JPRS-70017] N77-33844
INFECTIOUS DISEASES
Analysis of the Skylab flight crew health stabilization program
N77-33787
INSTITUTIONS
Human behavior in institutional fires and its design implications
[NBS-GCR-77-93] N77-33854
INTELLIGIBILITY
A review of the literature on the legibility of alphanumerics on electronic displays
[AD-A040625] N77-33856
INTRAOCULAR PRESSURE
The dependence of intraocular pressure and central artery collapse pressure upon weightlessness. Methodical approach to experiments during Spacelab flight
N77-32711
IRRADIATION
Plasma and tissue lipid changes in rats irradiated in cosmic space
[IAF PAPER 77-263] A77-51503
ISCHEMIA
Ischaemic heart disease - A problem in aircraft accident reconstruction
A77-50759
ISOLATION
Analysis of the Skylab flight crew health stabilization program
N77-33787

L

LANGUAGE PROCESSING
Limited vocabulary natural language dialogue
A77-49222
LEARNING THEORY
Learning process and nonlinear behavior of human operators in stabilizing unstable systems
A77-48491
LEG (ANATOMY)
Hemodynamic studies of the legs under weightlessness
N77-33811
Automatic blood pressure measuring system (M091)
N77-33822
Tolerance and response of the knee-femur-pelvis complex to axial impact
[PB-269059/2] N77-33864
LIFE SCIENCES
Chlorophyll derivatives in modern soils in relation to the problem of the chemical evolution and origin of life on earth
A77-48034
LIGANDS
Influence of temperature on hemoglobin-ligand interaction in whole blood
A77-49263
LIGHT TRANSMISSION
Investigation of inside light reflection problem on the Flat Plate Canopy (FPC) for model 209 AH-1S helicopter
[AD-A041332] N77-33858
LIMBS (ANATOMY)
Rotational motion of an astronaut's trunk --- body attitude change by arm and leg motions in weightlessness
A77-50308
LINEARIZATION
The proprioceptive contour as a linearizer of the eye movement system
A77-50806
LIPID METABOLISM
Characteristics of fatty acid metabolism in mammals during fasting
A77-49372
Plasma and tissue lipid changes in rats irradiated in cosmic space
[IAF PAPER 77-263] A77-51503
The effect of prolonged space flight on liver enzyme activities and on lipogenesis in adipose tissue of rats
[IAF PAPER 77-267] A77-51507
LIVER
Influence of irradiation and space flight factors of nucleic acids and deoxyribonucleoprotein in liver and spleen of rat
[IAF PAPER 77-265] A77-51505
The effect of prolonged space flight on liver enzyme activities and on lipogenesis in adipose tissue of rats
[IAF PAPER 77-267] A77-51507
LOADS (FORCES)
Estimate of the perceptive load by variability of rate of heartbeat
[AD-A042495] N77-32709
LONG TERM EFFECTS
The effect of prolonged hypokinesis on the function of the auditory analyzer
A77-48464
LUNGS
Local features in the lung of healthy subjects and in pulmonary pathology
A77-49438
Lung capacities of healthy subjects of different ages
A77-49439

M

MAMMALS
Characteristics of fatty acid metabolism in mammals during fasting
A77-49372
MAN MACHINE SYSTEMS
Learning process and nonlinear behavior of human operators in stabilizing unstable systems
A77-48491
Limited vocabulary natural language dialogue
A77-49222
The controller and automation --- computerized air traffic control
A77-49223
A spatial frequency analysis model for predicting human performance at visual pattern matching tasks
[AD-A041649] N77-33859
Interactive system design considerations
[PU1B2/76] N77-33863
MANIPULATORS
Application of optimal and adaptive algorithm control to the system robot-manipulator in cosmic space
[IAF PAPER 77-ST-02] A77-51567
Anthropomorphic master/slave manipulator system
[NASA-CASE-ARC-10756-1] N77-32721
Compact artificial hand
[NASA-CASE-NPO-13906-1] N77-32723

MANUAL CONTROL
Learning process and nonlinear behavior of human operators in stabilizing unstable systems
A77-48491
MATERIALS TESTS
Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system
A77-50631
MEASUREMENT
Atmospheric analyzer, carbon monoxide monitor and toluene diisocyanate monitor
N77-33834
MEASURING INSTRUMENTS
Automatic blood pressure measuring system (M091)
N77-33822
Automatic blood pressure measuring system (M092)
N77-33823
Vectorcardiograph
N77-33824
Carbon dioxide/dewpoint monitor
N77-33833
MEDICAL ELECTRONICS
An acoustic transducer for application in kinetocardiography
A77-49274
Some problems in cardiac electrokymography
A77-49446
MEDICAL EQUIPMENT
Emergency medical kits aboard aircraft
A77-49840
Efficiency of the oxygen mask delivery system at the USAF hyperbaric center
A77-49928
Feasibility study on the design of a probe for rectal cancer detection
[NASA-CR-155043] N77-32708
Skylab medical program overview
N77-33781
MEDICAL SCIENCE
Translation on USSR science and technology biomedical sciences, no. 9
[JPRS-69899] N77-33841
Translations on USSR science and technology biomedical sciences, no. 10
[JPRS-69924] N77-33842
MEMBRANES
Model for some nonthermal effects of radio and microwave fields on biological membranes
A77-49503
METABOLISM
Morphological and histochemical indices of compensatory adaptations in organs in response to oxygen insufficiency
A77-49444
Toxicology of metals, volume 2
[PB-268324/1] N77-32715
Red cell metabolism studies on Skylab
N77-33807
Results of Skylab medical experiment M171-metabolic activity
N77-33816
Metabolic cost of extravehicular activities
N77-33818
Metabolic analyzer
N77-33827
Higher plant metabolism and energetics in hypogravity: Amino acid metabolism in higher plants
[NASA-CR-155198] N77-33840
METALS
Toxicology of metals, volume 2
[PB-268324/1] N77-32715
MICE
Effect of ammonia on Swiss albino mice
A77-50635
MICROORGANISMS
Skylab environmental and crew microbiology studies
N77-33788
MICROWAVE EMISSION
The functional state of the hypothalamus-pituitary-adrenal cortex system as a criterion for setting a standard for microwave radiation
A77-50922
MICROWAVES
Model for some nonthermal effects of radio and microwave fields on biological membranes
A77-49503
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI annual meeting, volume 1
[PB-268094/0] N77-32712
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI Annual Meeting, volume 2
[PB-268095/7] N77-33853
MIDDLE EAR PRESSURE
Round window tear in aviators --- middle ear damage as aircraft accident cause
A77-50762
MILITARY TECHNOLOGY
Double knit aramid flight suits for aircrewmen
A77-49938
The VTAS/helmet interface --- Visual Target Acquisition Set
A77-49941
Human compatibility testing of the RAF P/Q oxygen mask with the USAF HGU-2A/P flying helmet
A77-49942
MINERAL METABOLISM
Mineral and nitrogen metabolic studies, experiment M071
N77-33798
MISSION PLANNING
Space shuttle life sciences requirements development and documentation
[NASA-CR-151529] N77-33838
MORPHOLOGICAL INDEXES
Morphological and histochemical indices of compensatory adaptations in organs in response to oxygen insufficiency
A77-49444
MORTALITY
Cause of death in aircraft accidents - Drowning vs. traumatic injuries
A77-50753
Medical investigation of fatalities from aircraft-accident burns
A77-50760
MOTION PERCEPTION
Is the discrimination of motion-path length unique
A77-48023
MOTION SICKNESS DRUGS
Evaluation of a new antinauseant drug for the prevention of motion sickness
A77-49837
MOTION SIMULATORS
Engineering and geographic constraints of a six degree of freedom synergistic platform motion system
[AD-A043194] N77-32728
MOTOR VEHICLES
Tolerance and response of the knee-femur-pelvis complex to axial impact
[PB-269059/2] N77-33864
MUSCLES
Investigate methods for measuring muscle and bone mass changes in astronauts and animals which occur during space flight
[NASA-CR-151518] N77-33837
MUSCULAR FUNCTION
Muscular control during some voluntary motions with one degree of freedom. II - Multiple motions
A77-48320
Respiration efficiency of athletes engaged in muscular activity of different intensity
A77-49441
Influence of water temperature on thermal, circulatory and respiratory responses to muscular work
A77-49923
Changes in the Achilles tendon reflexes following Skylab missions
N77-33795
Muscular deconditioning and its prevention in space flight
N77-33801
MUSCULOSKELETAL SYSTEM
Effect of space flight factors on glycogen metabolic system and on ionic composition of rat skeletal muscle
[IAF PAPER 77-264] A77-51504
MYOCARDIUM
Effect of heparin-induced free fatty acid elevation on myocardial oxygen consumption in man
A77-48481

Some problems in cardiac electrokymography
A77-49446

N

NEOPLASMS
Sarcoidosis - A review of some features of importance in aviation medicine
A77-50757
Sarcoid and the heart - An aeromedical risk
A77-50758
NEURAL NETS
Cerebellar dynamics - The mossy fiber input --- neurophysiological model
A77-49272
NEUROMUSCULAR TRANSMISSION
Effect of postsynaptic factors on presynaptic nerve endings /functional feedbacks in the synapse/
A77-49370
NEURONS
A computer controlled method for determining the fields of visual system neurons
A77-49273
NEUROPHYSIOLOGY
Cerebellar dynamics - The mossy fiber input --- neurophysiological model
A77-49272
Effect of postsynaptic factors on presynaptic nerve endings /functional feedbacks in the synapse/
A77-49370
Mechanisms of neurogenic vasodilation
A77-49371
Origins of serotonin innervation of forebrain structures
A77-51617
NITROGEN
Biological effect of fire suppression by nitrogen pressurization in enclosed environments
A77-50630
NITROGEN METABOLISM
Mineral and nitrogen metabolic studies, experiment M071
N77-33798
NOISE INJURIES
Noise induced hearing loss. Noise evaluation. The use of hearing protectors
[NTNF-4] N77-33852
NOISE REDUCTION
Impact of noise control at the workplace. Volumes 1 and 2, appendices A-G and volume 3, appendices H and I (econometric simulation)
[PB-268231/8] N77-32716
NUMERICAL CONTROL
Automated chest X-ray analysis
[LA-UR-77-532] N77-33851

O

OCULAR CIRCULATION
Mechanisms for the formation of rheoophthalograms and electroplethysmograms of the eye
A77-50745
ONBOARD EQUIPMENT
Lower body negative pressure device
N77-33821
Automatic blood pressure measuring system (M091)
N77-33822
Vectorcardiograph
N77-33824
A.I.e. in-flight blood collection system
N77-33825
Ergometer
N77-33826
Metabolic analyzer
N77-33827
Skylab experiment M131: Rotating little chair
N77-33830
Experiment support system
N77-33831
In-flight medical support system
N77-33832
Carbon dioxide/dewpoint monitor
N77-33833
Atmospheric analyzer, carbon monoxide monitor and toluene diisocyanate monitor
N77-33834
Skylab hardware report operational bioinstrumentation system
N77-33835
Exerciser
N77-33836
ONTOGENY
Ontogenetic features of the reaction of adrenergic systems to hypergravity
A77-48479
OPERATING SYSTEMS (COMPUTERS)
Skylab hardware report operational bioinstrumentation system
N77-33835
OPERATOR PERFORMANCE
Learning process and nonlinear behavior of human operators in stabilizing unstable systems
A77-48491
The human operator in the search situation --- pattern recognition problems
A77-49673
OPHTHALMOLOGY
Mechanisms for the formation of rheoophthalograms and electroplethysmograms of the eye
A77-50745
OPTICAL SCANNERS
Feasibility study on the design of a probe for rectal cancer detection
[NASA-CR-155043] N77-32708
OPTICAL TRACKING
Effects of visual propioceptive cue conflicts on human tracking performance
[AD-A042006] N77-33860
OPTIMAL CONTROL
Application of optimal and adaptive algorithm control to the system robot-manipulator in cosmic space
[IAF PAPER 77-ST-02] A77-51567
OPTOMETRY
Prevention of visual anxiety and proficiency problems in the senior air transport pilot
A77-49839
ORAL HYGIENE
Skylab oral health studies
N77-33786
ORGANISMS
Functional relation between the spectrum of atmospheric electrical discharges and biological activity of living organisms
A77-49468
ORTHOSTATIC TOLERANCE
Exercise and heat orthostatism and the effect of heat acclimation and physical fitness
A77-49833
Lower body negative pressure: Third manned Skylab mission
N77-33809
Activity of the digestive system during 49-day antiorthostatic human hypokinesia
[NASA-TM-75177] N77-33846
OXYGEN BREATHING
Ultrastructural changes in tracheal epithelial cells exposed to oxygen
A77-49829
Efficiency of the oxygen mask delivery system at the USAF hyperbaric center
A77-49928
OXYGEN CONSUMPTION
Effect of heparin-induced free fatty acid elevation on myocardial oxygen consumption in man
A77-48481
Influence of temperature on hemoglobin-ligand interaction in whole blood
A77-49263
Tissue respiration features in white rats exhibiting high and low resistance to hypoxia
A77-49443
Energetics of the heart during hypothermia
A77-50747
Use of a GL-5118 gas analyzer to measure the amount of oxygen consumption under conditions of increased pressure of the gaseous medium
A77-50750
Metabolic responses to exercise in three thermal environments
A77-50764
On the possibilities of prediction of differences in radiation resistance of individuals
[IAF PAPER 77-250] A77-51498

OXYGEN MASKS
The objective evaluation of aircrew protective breathing equipment. I - Oxygen mask/goggles combinations. II - Fullface masks and hoods
A77-49927
Efficiency of the oxygen mask delivery system at the USAF hyperbaric center
A77-49928
The use of n-pentane as a tracer gas for the quantitative evaluation of aircrew protective breathing equipment
A77-49929
Human compatibility testing of the RAF P/Q oxygen mask with the USAF HGU-2A/P flying helmet
A77-49942
OXYGEN METABOLISM
Changes in energy consumption rate and respiratory functions of athletes subjected to thermal stress
A77-49442
Metabolic responses to exercise in three thermal environments
A77-50764

P

PARACHUTE DESCENT
Design and development of the Irvin 'Hitefinder' Automatic Parachute Ripcord Release
A77-49944
PATHOLOGICAL EFFECTS
Local features in the lung of healthy subjects and in pulmonary pathology
A77-49438
Sarcoidosis - A review of some features of importance in aviation medicine
A77-50757
Studies on the relation between carboxyhemoglobin concentration and toxicity --- for aircraft accident victims
A77-50761
PATTERN RECOGNITION
The human operator in the search situation --- pattern recognition problems
A77-49673
A spatial frequency analysis model for predicting human performance at visual pattern matching tasks [AD-A041649]
N77-33859
PERCEPTION
Estimate of the perceptive load by variability of rate of heartbeat
[AD-A042495]
N77-32709
PERFORMANCE TESTS
USAFSAM evaluation of the Sierra Lightweight Helmet
A77-49952
PERIPHERAL CIRCULATION
Reparative processes in spleen and peripheral blood after the outset of continuous irradiation [IAF PAPER 77-266]
A77-51506
PERSONNEL SELECTION
Evaluation and disposition of Army helicopter aviators with finger amputations
A77-50756
Sarcoid and the heart - An aeromedical risk
A77-50758
Psychometric characteristics of astronauts [AD-A039228]
N77-33855
PHARMACOLOGY
Mechanisms of neurogenic vasodilation
A77-49371
Evaluation of a new antinauseant drug for the prevention of motion sickness
A77-49837
PHONOCARDIOGRAPHY
Distortion of non-invasive cardiac pulse curves - A capillary-damped pick-up and a calibration unit for apex cardiograms and other pulse curves
A77-48418
PHOTOGRAMMETRY
Stereo acuity and reconnaissance. Phase 2: Development of a Foveal-Parafoveal chromostereopsis test [AD-A043258]
N77-32719
PHOTOSENSITIVITY
Evaluation of single-pigment shift model of anomalous trichromacy
A77-49308
PHYSICAL EXERCISE
Recovery from exercise at varying work loads - Time course of responses of heart rate and systolic intervals
A77-48417
The exercise electrocardiogram in diagnosis
A77-49182
Respiration efficiency of athletes engaged in muscular activity of different intensity
A77-49441
Changes in energy consumption rate and respiratory functions of athletes subjected to thermal stress
A77-49442
Exercise and heat orthostatism and the effect of heat acclimation and physical fitness
A77-49833
Influence of water temperature on thermal, circulatory and respiratory responses to muscular work
A77-49923
Cardiorespiratory responses to exercise after bed rest in men and women
A77-50444
Metabolic responses to exercise in three thermal environments
A77-50764
Skylab 4 crew observations
N77-33783
Muscular deconditioning and its prevention in space flight
N77-33801
Ergometer
N77-33826
Exerciser
N77-33836
PHYSICAL FITNESS
Exercise and heat orthostatism and the effect of heat acclimation and physical fitness
A77-49833
PHYSICAL WORK
Crew efficiency on first exposure to zero-gravity
N77-33797
PHYSICIANS
Some aspects of the clinical training of aviation physicians
A77-48461
PHYSIOLOGICAL EFFECTS
The functional state of an organism subjected to general low-frequency vibrations and impact acceleration
A77-48462
Renin, aldosterone, electrolyte, and cortisol responses to hypoxic decompression
A77-49261
Sarcoidosis - A review of some features of importance in aviation medicine
A77-50757
Skylab crew health: Crew surgeon's report
N77-33785
PHYSIOLOGICAL FACTORS
Lung capacities of healthy subjects of different ages
A77-49439
PHYSIOLOGICAL RESPONSES
Hormonal changes under altitude stress
A77-47991
Recovery from exercise at varying work loads - Time course of responses of heart rate and systolic intervals
A77-48417
A computer controlled method for determining the fields of visual system neurons
A77-49273
The relationship between physiological parameters and performance in a compensatory tracking test to determine aptitude
A77-49924
Cardiorespiratory responses to exercise after bed rest in men and women
A77-50444
The use of a behavioral response system in the USF/NASA toxicity screening test method
A77-50627
Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system
A77-50631
Variation in animal response to different toxicants
A77-50636

A review of available LC/50/ data --- on toxic gases encountered in fires A77-50638
The functional state of the hypothalamus-pituitary-adrenal cortex system as a criterion for setting a standard for microwave radiation A77-50922
Problems of rehabilitation and recovery of altered physiological functions after space flight [IAF PAPER 77-253] A77-51499
Biomedical results from Skylab [NASA-SP-377] N77-33780
Skylab 2 crew observations and summary N77-33784
Skylab crew health: Crew surgeon's report N77-33785
Skylab experiment M131: Rotating little chair N77-33830
Response of the cardiovascular system to vibration and combined stresses [AD-A039000] N77-33848

PHYSIOLOGICAL TESTS
Cerebellar dynamics - The mossy fiber input --- neurophysiological model A77-49272
Laboratory examination of unidentified suspected tissue fragments found at aircraft sites A77-50754
The ability to endure Coriolis force and some questions of vestibular choice A77-50923
Some results of biological investigations aboard the biosatellite Cosmos-782 [IAF PAPER 77-262] A77-51502

PHYSIOLOGY
Estimate of the perceptive load by variability of rate of heartbeat [AD-A042495] N77-32709

PILOT ERROR
Correlation of occurrence of aircraft accidents with biorhythmic criticality and cycle phase in U.S. Air Force, U.S. Army, and civil aviation pilots A77-50763

PILOT PERFORMANCE
The significance of a psychophysiological norm for flying time for the medical safeguarding of flights A77-48463
Disorienting effects of aircraft catapult launchings. III - Cockpit displays and piloting performance A77-49826
Crew behavior in accident causation --- pilot as information processor A77-50752
Evaluation and disposition of Army helicopter aviators with finger amputations A77-50756
Sarcoid and the heart - An aeromedical risk A77-50758
The effects of system and environmental factors upon experienced pilot performance in the advanced simulator for pilot training [AD-A043195] N77-32717

PILOT SELECTION
Previous disease in aircrew killed in flying accidents A77-50755

PILOTS
Repeated examination in a low-pressure chamber of pilots with reduced ability to endure hypoxia A77-50924

PILOTS (PERSONNEL)
Retention of selected physiological indicators in pilots in the course of agricultural flights [NASA-TT-F-17441] N77-33845

PLANTS (BOTANY)
Reports from the German meteorological service. Volume 18, no. 142: The weather dependent yield of some shortliving food plants [ISBN-3-88148-125-7] N77-32707
Study of metabolism and energetics in hypogravity: Degenerative effects of prolonged hypogravity [NASA-CR-155199] N77-33839
Higher plant metabolism and energetics in hypogravity: Amino acid metabolism in higher plants [NASA-CR-155198] N77-33840

PLETHYSMOGRAPHY
An electrode system for tetrapolar electrical impedance plethysmography of the finger A77-51616

POLYCARBONATES
The use of a behavioral response system in the USF/NASA toxicity screening test method A77-50627

POLYMER CHEMISTRY
Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system A77-50631

POLYSACCHARIDES
Age-related changes in the mucopolysaccharide content in human coronary-artery walls A77-49472

POSTFLIGHT ANALYSIS
Problems of rehabilitation and recovery of altered physiological functions after space flight [IAF PAPER 77-253] A77-51499

POSTURE
The effects of prolonged exposure to weightlessness on postural equilibrium N77-33792

PRESBYOPIA
Prevention of visual anxiety and proficiency problems in the senior air transport pilot A77-49839

PRESSURE EFFECTS
Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-O2 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/ A77-49834
The probability of decompression sickness as a result of going out in a pressure suit from a spacecraft with an atmosphere close to that on earth [IAF PAPER A-77-41] A77-51519

PRESSURE SUITS
The probability of decompression sickness as a result of going out in a pressure suit from a spacecraft with an atmosphere close to that on earth [IAF PAPER A-77-41] A77-51519

PROBLEM SOLVING
Limited vocabulary natural language dialogue A77-49222

PROGRAMMING LANGUAGES
Limited vocabulary natural language dialogue A77-49222

PROPRIOCEPTION
Antisomatogyral illusion --- perceived motion reversal after bodily rotation A77-49836
The proprioceptive contour as a linearizer of the eye movement system A77-50806
Effects of visual propioceptive cue conflicts on human tracking performance [AD-A042006] N77-33860

PROSTHETIC DEVICES
Compact artificial hand [NASA-CASE-NPO-13906-1] N77-32723

PROTECTIVE CLOTHING
Operational requirements for aircrew antiexposure suits in the U.S. Navy A77-49937
The Arctic personnel ambulatory anti-exposure system A77-49939
Development of a helmet-mounted PLZT thermal/flash protection system --- Polycrystalline Lead Zirconate Titanate ceramics A77-49943

PROTEIN METABOLISM
The effect of prolonged space flight on liver enzyme activities and on lipogenesis in adipose tissue of rats [IAF PAPER 77-267] A77-51507

PSYCHOLOGICAL FACTORS
Problems of ecological psychology during prolonged stay in sealed chambers [IAF PAPER 77-244] A77-51495

PSYCHOMOTOR PERFORMANCE
Biomedical aspects of the mastering of outer space with the aid of remotely controlled devices --- for planetary rover operator training
[IAF PAPER 77-242] A77-51493
PSYCHOPHYSICS
Evaluation of single-pigment shift model of anomalous trichromacy
A77-49308
PSYCHOPHYSIOLOGY
The significance of a psychophysiological norm for flying time for the medical safeguarding of flights
A77-48463
PULMONARY CIRCULATION
Functional changes in the respiratory system of dogs in the case of alveolar hypoxia with hypercapnia
A77-50749
PULMONARY FUNCTIONS
Lung capacities of healthy subjects of different ages
A77-49439
Pulmonary function evaluation during and following Skylab space flights
N77-33817
PULMONARY LESIONS
Local features in the lung of healthy subjects and in pulmonary pathology
A77-49438
PYROLYSIS
The use of a behavioral response system in the USF/NASA toxicity screening test method
A77-50627
Effect of ammonia on Swiss albino mice
A77-50635
Variation in animal response to different toxicants
A77-50636
A review of available LC/50/ data --- on toxic gases encountered in fires
A77-50638

Q

QUALITY CONTROL
Experimental designs and psychometric techniques for the study of ride quality
[PB-268584/0] N77-32729

R

RADIATION DAMAGE
Evaluation of the potential retinal hazards from optical radiation generated by electric welding and cutting ARCS
[AD-A043023] N77-32710
RADIATION DOSAGE
Reparative processes in spleen and peripheral blood after the outset of continuous irradiation
[IAF PAPER 77-266] A77-51506
Radiological protection and medical dosimetry for the Skylab crewmen
N77-33789
RADIATION EFFECTS
Model for some nonthermal effects of radio and microwave fields on biological membranes
A77-49503
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI annual meeting, volume 1
[PB-268094/0] N77-32712
RADIATION SHIELDING
Radiological protection and medical dosimetry for the Skylab crewmen
N77-33789
RADIATION TOLERANCE
On the possibilities of prediction of differences in radiation resistance of individuals
[IAF PAPER 77-250] A77-51498
RADIO FREQUENCIES
Model for some nonthermal effects of radio and microwave fields on biological membranes
A77-49503
RADIOBIOLOGY
The functional state of the hypothalamus-pituitary-adrenal cortex system as a criterion for setting a standard for microwave radiation
A77-50922
On the possibilities of prediction of differences in radiation resistance of individuals
[IAF PAPER 77-250] A77-51498
Plasma and tissue lipid changes in rats irradiated in cosmic space
[IAF PAPER 77-263] A77-51503
Influence of irradiation and space flight factors of nucleic acids and deoxyribonucleoprotein in liver and spleen of rat
[IAF PAPER 77-265] A77-51505
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI annual meeting, volume 1
[PB-268094/0] N77-32712
RADIOGRAPHY
Marginal alveolar bone loss in flying personnel - A radiographical followup study
A77-49827
RECORDING INSTRUMENTS
An electrode system for tetrapolar electrical impedance plethysmography of the finger
A77-51616
RECTUM
Feasibility study on the design of a probe for rectal cancer detection
[NASA-CR-155043] N77-32708
REFLECTION
Investigation of inside light reflection problem on the Flat Plate Canopy (FPC) for model 209 AH-IS helicopter
[AD-A041332] N77-33858
REFLEXES
Changes in the Achilles tendon reflexes following Skylab missions
N77-33795
REMOTE CONTROL
Biomedical aspects of the mastering of outer space with the aid of remotely controlled devices --- for planetary rover operator training
[IAF PAPER 77-242] A77-51493
REMOTE HANDLING
Anthropomorphic master/slave manipulator system
[NASA-CASE-ARC-10756-1] N77-32721
RESPIRATION
Correlation between ventilatory and cerebrovascular responses to inhalation of CO
A77-49262
RESPIRATORY DISEASES
Local features in the lung of healthy subjects and in pulmonary pathology
A77-49438
RESPIRATORY PHYSIOLOGY
Ecological aspects of respiratory physiology and hereditary variations in reactivity
A77-49437
Influence of water temperature on thermal, circulatory and respiratory responses to muscular work
A77-49923
Functional changes in the respiratory system of dogs in the case of alveolar hypoxia with hypercapnia
A77-50749
RESPIRATORY RATE
Age differences in human external respiration response to hyperoxic and hypoxic gas mixtures
A77-49440
Respiration efficiency of athletes engaged in muscular activity of different intensity
A77-49441
Changes in energy consumption rate and respiratory functions of athletes subjected to thermal stress
A77-49442
Tissue respiration features in white rats exhibiting high and low resistance to hypoxia
A77-49443
RESPIRATORY SYSTEM
Cardiorespiratory responses to exercise after bed rest in men and women
A77-50444
RESPIROMETERS
Metabolic analyzer
N77-33827
RETINA
Evaluation of the potential retinal hazards from optical radiation generated by electric welding and cutting ARCS
[AD-A043023] N77-32710

The dependence of intraocular pressure and central artery collapse pressure upon weightlessness. Methodical approach to experiments during Spacelab flight
N77-32711

RETINAL ADAPTATION
Adaptation to displaced vision - Evidence for transfer of adaptation and long-lasting aftereffects
A77-48022

RHEOLOGY
Mechanisms for the formation of rheoophthalograms and electroplethysmograms of the eye
A77-50745

RHYTHM (BIOLOGY)
Current problems in space biorhythmology --- Russian book
A77-50686
Correlation of occurrence of aircraft accidents with biorhythmic criticality and cycle phase in U.S. Air Force, U.S. Army, and civil aviation pilots
A77-50763

RIBONUCLEIC ACIDS
Influence of irradiation and space flight factors of nucleic acids and deoxyribonucleoprotein in liver and spleen of rat
[IAF PAPER 77-265] A77-51505

ROBOTS
Mechanized experiment planning in automaton-environment systems
A77-49335
Application of optimal and adaptive algorithm control to the system robot-manipulator in cosmic space
[IAF PAPER 77-ST-02] A77-51567

ROTATING BODIES
Skylab experiment M131: Rotating little chair
N77-33830

ROVING VEHICLES
Biomedical aspects of the mastering of outer space with the aid of remotely controlled devices --- for planetary rover operator training
[IAF PAPER 77-242] A77-51493

S

SACCADIC EYE MOVEMENTS
Delay of stimulus presentation after the saccade in visual search
A77-48024

SAFETY
Guidebook on anthropomorphic test dummy usage
[PB-268904/0] N77-33865

SAFETY DEVICES
Some influences of restraint harness design on accident pathology
A77-50751

SAFETY FACTORS
The helmet protects the aviator's head - Or does it
A77-50660

SAMPLING
A.I.e. in-flight blood collection system
N77-33825

SEATS
Improved seat, console, and workplace design: Annotated bibliography, integration of the literature, accommodation model, and seated operator reach profiles
[AD-A040479] N77-33857

SENSORIMOTOR PERFORMANCE
Adaptation to displaced vision - Evidence for transfer of adaptation and long-lasting aftereffects
A77-48022
Delay of stimulus presentation after the saccade in visual search
A77-48024

SEROTONIN
Origins of serotonin innervation of forebrain structures
A77-51617

SIGNAL DISTORTION
Distortion of non-invasive cardiac pulse curves - A capillary-damped pick-up and a calibration unit for apex cardiograms and other pulse curves
A77-48418

SIZE DETERMINATION
Perceived size and distance as a perceptual conflict between two processing modes
A77-48025
Determination of cardiac size from chest roentgenograms following Skylab missions
N77-33819

SKIN TEMPERATURE (BIOLOGY)
Mean skin temperature weighted with both ratios of heat transfer coefficient and body surface area --- human body-environment interactions
A77-51215

SKYLAB PROGRAM
Biomedical results from Skylab
[NASA-SP-377] N77-33780
Skylab medical program overview
N77-33781
Flight control experiences
N77-33782
Skylab crew health: Crew surgeon's report
N77-33785
Skylab oral health studies
N77-33786
Analysis of the Skylab flight crew health stabilization program
N77-33787
Skylab environmental and crew microbiology studies
N77-33788
Radiological protection and medical dosimetry for the Skylab crewmen
N77-33789
Toxicological aspects of the Skylab program
N77-33790
Experiment M131. Human vestibular function
N77-33791
The effects of prolonged exposure to weightlessness on postural equilibrium
N77-33792
Experiment M133. Sleep monitoring on Skylab
N77-33793
Visual light flash observations on Skylab 4
N77-33794
Changes in the Achilles tendon reflexes following Skylab missions
N77-33795
Task and work performance on Skylab missions 2, 3, and 4: Time and motion study: Experiment M151
N77-33796
Crew efficiency on first exposure to zero-gravity
N77-33797
Mineral and nitrogen metabolic studies, experiment M071
N77-33798
Physiological mass measurements in Skylab
N77-33799
Bone mineral measurement: Experiment M078
N77-33800
Muscular deconditioning and its prevention in space flight
N77-33801
Biostereometric analysis of body form
N77-33802
Biochemical responses of the Skylab crewmen: An overview
N77-33803
Cytogenetic studies of blood, experiment M111
N77-33804
The response of single human bells to zero-gravity
N77-33805
Blood volume changes
N77-33806
Red cell metabolism studies on Skylab
N77-33807
Hematology and immunology studies
N77-33808
Vectorcardiographic results from Skylab medical experiment M092: Lower body negative pressure
N77-33810
Results of Skylab medical experiment M171-metabolic activity
N77-33816
Pulmonary function evaluation during and following Skylab space flights
N77-33817
Determination of cardiac size from chest roentgenograms following Skylab missions
N77-33819

Hardware report for experiment M133, sleep monitoring on Skylab
N77-33829
Skylab experiment M131: Rotating little chair
N77-33830
Skylab hardware report operational bioinstrumentation system
N77-33835

SKYLAB 2
Skylab 2 crew observations and summary
N77-33784

SKYLAB 3
Lower body negative pressure: Third manned Skylab mission
N77-33809

SKYLAB 4
Skylab 4 crew observations
N77-33783

SLEEP
Experiment M133. Sleep monitoring on Skylab
N77-33793
Hardware report for experiment M133, sleep monitoring on Skylab
N77-33829

SODIUM 22
Investigate methods for measuring muscle and bone mass changes in astronauts and animals which occur during space flight
[NASA-CR-151518] N77-33837

SOIL SCIENCE
Chlorophyll derivatives in modern soils in relation to the problem of the chemical evolution and origin of life on earth
A77-48034

SPACE EXPLORATION
Biomedical aspects of the mastering of outer space with the aid of remotely controlled devices --- for planetary rover operator training
[IAF PAPER 77-242] A77-51493

SPACE FLIGHT FEEDING
Skylab 4 crew observations
N77-33783

SPACE FLIGHT STRESS
Current problems in space biorhythmology --- Russian book
A77-50686
Problems of ecological psychology during prolonged stay in sealed chambers
[IAF PAPER 77-244] A77-51495
Problems of rehabilitation and recovery of altered physiological functions after space flight
[IAF PAPER 77-253] A77-51499
Reaction of the adrenal cortex and medulla to prolonged space flight in Wistar rats
[IAF PAPER 77-261] A77-51501
Effect of space flight factors on glycogen metabolic system and on ionic composition of rat skeletal muscle
[IAF PAPER 77-264] A77-51504
Influence of irradiation and space flight factors of nucleic acids and deoxyribonucleoprotein in liver and spleen of rat
[IAF PAPER 77-265] A77-51505
The effect of prolonged space flight on liver enzyme activities and on lipogenesis in adipose tissue of rats
[IAF PAPER 77-267] A77-51507
Biomedical results from Skylab
[NASA-SP-377] N77-33780
Biostereometric analysis of body form
N77-33802

SPACE PERCEPTION
Perceived size and distance as a perceptual conflict between two processing modes
A77-48025

SPACE SHUTTLES
Space shuttle life sciences requirements development and documentation
[NASA-CR-151529] N77-33838

SPACE SUITS
The probability of decompression sickness as a result of going out in a pressure suit from a spacecraft with an atmosphere close to that on earth
[IAF PAPER A-77-41] A77-51519

SPACECRAFT CABIN ATMOSPHERES
A study of the crew metabolic contribution into the space cabin atmosphere during space flights
[IAF PAPER 77-243] A77-51494
Regenerable device for scrubbing breathable air of CO2 and moisture without special heat exchanger equipment
[NASA-CASE-MSC-14771-1] N77-32722

SPACECRAFT CONTAMINATION
A study of the crew metabolic contribution into the space cabin atmosphere during space flights
[IAF PAPER 77-243] A77-51494

SPACECRAFT ENVIRONMENTS
Some aspects of energy metabolism in human blood erythrocytes under hypokinesia and during space flights
A77-49831

SPACECREWS
A study of the crew metabolic contribution into the space cabin atmosphere during space flights
[IAF PAPER 77-243] A77-51494
Biomedical results from Skylab
[NASA-SP-377] N77-33780
Flight control experiences
N77-33782
Skylab 4 crew observations
N77-33783
Skylab 2 crew observations and summary
N77-33784
Skylab crew health: Crew surgeon's report
N77-33785
Skylab oral health studies
N77-33786
Analysis of the Skylab flight crew health stabilization program
N77-33787
Skylab environmental and crew microbiology studies
N77-33788
Radiological protection and medical dosimetry for the Skylab crewmen
N77-33789
Toxicological aspects of the Skylab program
N77-33790
Experiment M131. Human vestibular function
N77-33791
The effects of prolonged exposure to weightlessness on postural equilibrium
N77-33792
Experiment M133. Sleep monitoring on Skylab
N77-33793
Visual light flash observations on Skylab 4
N77-33794
Changes in the Achilles tendon reflexes following Skylab missions
N77-33795
Crew efficiency on first exposure to zero-gravity
N77-33797
Mineral and nitrogen metabolic studies, experiment M071
N77-33798
Physiological mass measurements in Skylab
N77-33799
Bone mineral measurement: Experiment M078
N77-33800
Muscular deconditioning and its prevention in space flight
N77-33801
Biostereometric analysis of body form
N77-33802
Biochemical responses of the Skylab crewmen: An overview
N77-33803
Cytogenetic studies of blood, experiment M111
N77-33804
Blood volume changes
N77-33806
Red cell metabolism studies on Skylab
N77-33807
Hematology and immunology studies
N77-33808
Vectorcardiographic results from Skylab medical experiment M092: Lower body negative pressure
N77-33810

SPACELAB
The dependence of intraocular pressure and central artery collapse pressure upon weightlessness. Methodical approach to experiments during Spacelab flight
N77-32711

SPACELAB PAYLOADS
Space shuttle life sciences requirements development and documentation
[NASA-CR-151529] N77-33838

SPATIAL DISTRIBUTION
A spatial frequency analysis model for predicting human performance at visual pattern matching tasks
[AD-A041649] N77-33859
SPHYGMOGRAPHY
The functional state of the cardiovascular system with sinocarotid reflex
A77-49445
SPIN TESTS
Antisomatogyral illusion --- perceived motion reversal after bodily rotation
A77-49836
SPLEEN
Influence of irradiation and space flight factors of nucleic acids and deoxyribonucleoprotein in liver and spleen of rat
[IAF PAPER 77-265] A77-51505
Reparative processes in spleen and peripheral blood after the outset of continuous irradiation
[IAF PAPER 77-266] A77-51506
STANDARDS
Impact of noise control at the workplace. Volumes 1 and 2, appendices A-G and volume 3, appendices H and I (econometric simulation)
[PB-268231/8] N77-32716
STATISTICAL TESTS
Mechanized experiment planning in automaton-environment systems
A77-49335
STEREOPHOTOGRAPHY
Stereo acuity and reconnaissance. Phase 2: Development of a Foveal-Parafoveal chromostereopsis test
[AD-A043258] N77-32719
STRESS (PHYSIOLOGY)
Hormonal changes under altitude stress
A77-47991
Changes in energy consumption rate and respiratory functions of athletes subjected to thermal stress
A77-49442
Response of the cardiovascular system to vibration and combined stresses
[AD-A039000] N77-33848
Neurophysiological estimates of human performance capabilities in aerospace systems
[AD-A038208] N77-33849
Psychometric characteristics of astronauts
[AD-A039228] N77-33855
STRESS (PSYCHOLOGY)
Effect of emotional stress on recognition of visual patterns
A77-49835
Previous disease in aircrew killed in flying accidents
A77-50755
Problems of ecological psychology during prolonged stay in sealed chambers
[IAF PAPER 77-244] A77-51495
STRESS ANALYSIS
Finite element stress analysis of the human left ventricle whose irregular shape is developed from single plane cineangiocardiogram
A77-51260
STRUCTURAL DESIGN
Development of an objective definition of habitability and a habitability data base
[AD-A041188] N77-32725
STRUCTURAL DESIGN CRITERIA
Concepts for the generation, communication, and evaluation of habitability criteria
[AD-A041187] N77-32724
STRUCTURAL VIBRATION
Pulsating seat cushion evaluation
A77-49940
SUBMERGED BODIES
Cause of death in aircraft accidents - Drowning vs. traumatic injuries
A77-50753
SUPPORT SYSTEMS
Experiment support system
N77-33831
In-flight medical support system
N77-33832
SURFACE PROPERTIES
Response surface methodology revisited: A commentary on research strategy
[AD-A043242] N77-32726
SURFACE VEHICLES
Experimental designs and psychometric techniques for the study of ride quality
[PB-268584/0] N77-32729
SYNAPSES
Effect of postsynaptic factors on presynaptic nerve endings /functional feedbacks in the synapse/
A77-49370
SYSTEM EFFECTIVENESS
The objective evaluation of aircrew protective breathing equipment. I - Oxygen mask/goggles combinations. II - Fullface masks and hoods
A77-49927
Efficiency of the oxygen mask delivery system at the USAF hyperbaric center
A77-49928
The use of n-pentane as a tracer gas for the quantitative evaluation of aircrew protective breathing equipment
A77-49929
SYSTEMS ANALYSIS
Interactive system design considerations
[PU1B2/76] N77-33863
SYSTEMS ENGINEERING
A.I.e. in-flight blood collection system
N77-33825
SYSTEMS STABILITY
Learning process and nonlinear behavior of human operators in stabilizing unstable systems
A77-48491
SYSTOLE
Recovery from exercise at varying work loads - Time course of responses of heart rate and systolic intervals
A77-48417

T

TARGET ACQUISITION
The VTAS/helmet interface --- Visual Target Acquisition Set
A77-49941
TARGET RECOGNITION
Results of field experiments concerning visibility of objects
[DLR-IB-553-77/3] N77-32730
The maximum detection range and the maximum recognition distance when observing ground targets from helicopters
[DLR-IB-553-76/3] N77-33861
TASKS
Task and work performance on Skylab missions 2, 3, and 4: Time and motion study: Experiment M151
N77-33796
TECHNOLOGY UTILIZATION
An acoustic transducer for application in kinetocardiography
A77-49274
TELEOPERATORS
Biomedical aspects of the mastering of outer space with the aid of remotely controlled devices --- for planetary rover operator training
[IAF PAPER 77-242] A77-51493
TEMPERATURE EFFECTS
Influence of temperature on hemoglobin-ligand interaction in whole blood
A77-49263
Changes in energy consumption rate and respiratory functions of athletes subjected to thermal stress
A77-49442
TEMPERATURE MEASUREMENT
Body temperature measuring system (M171)
N77-33828
THERMAL ENVIRONMENTS
Metabolic responses to exercise in three thermal environments
A77-50764
Mean skin temperature weighted with both ratios of heat transfer coefficient and body surface area --- human body-environment interactions
A77-51215
THERMAL PROTECTION
Operational requirements for aircrew antiexposure suits in the U.S. Navy
A77-49937
The Arctic personnel ambulatory anti-exposure system
A77-49939

THERMOREGULATION
Influence of water temperature on thermal, circulatory and respiratory responses to muscular work A77-49923
Metabolic responses to exercise in three thermal environments A77-50764
TISSUES (BIOLOGY)
Tissue respiration features in white rats exhibiting high and low resistance to hypoxia A77-49443
Laboratory examination of unidentified suspected tissue fragments found at aircraft sites A77-50754
TOLUENE
Atmospheric analyzer, carbon monoxide monitor and toluene diisocyanate monitor N77-33834
TORSO
Rotational motion of an astronaut's trunk --- body attitude change by arm and leg motions in weightlessness A77-50308
TOXICITY
The use of a behavioral response system in the USF/NASA toxicity screening test method A77-50627
Biological effect of fire suppression by nitrogen pressurization in enclosed environments A77-50630
Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system A77-50631
Effect of ammonia on Swiss albino mice A77-50635
Variation in animal response to different toxicants A77-50636
A review of available LC/50/ data --- on toxic gases encountered in fires A77-50638
TOXICITY AND SAFETY HAZARD
Toxicological aspects of the Skylab program N77-33790
TOXICOLOGY
Toxicology of metals, volume 2 [PB-268328/1] N77-32715
TRACE ELEMENTS
The use of n-pentane as a tracer gas for the quantitative evaluation of aircrew protective breathing equipment A77-49929
TRACHEA
Ultrastructural changes in tracheal epithelial cells exposed to oxygen A77-49829
TRAINING DEVICES
Biomedical aspects of the mastering of outer space with the aid of remotely controlled devices --- for planetary rover operator training [IAF PAPER 77-242] A77-51493
TRANSISTOR AMPLIFIERS
The problem of constructing bioamplifiers for dynamic biotelemetry studies A77-50909
TRANSPORTATION
Experimental designs and psychometric techniques for the study of ride quality [PB-268584/0] N77-32729

U

U.S.S.R.
Translations on USSR science and technology biomedical sciences, no. 12 [JPRS-70017] N77-33844
ULTRASONIC WAVE TRANSDUCERS
An acoustic transducer for application in kinetocardiography A77-49274
UNDERWATER BREATHING APPARATUS
Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-O2 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/ A77-49834
URINE
Renin, aldosterone, electrolyte, and cortisol responses to hypoxic decompression A77-49261

V

VASODILATION
Mechanisms of neurogenic vasodilation A77-49371
VECTORCARDIOGRAPHY
Vectorcardiographic results from Skylab medical experiment M092: Lower body negative pressure N77-33810
Vectorcardiographic changes during extended space flight (M093): Observations at rest and during exercise N77-33813
Vectorcardiograph N77-33824
VELOCITY MEASUREMENT
Is the discrimination of motion-path length unique A77-48023
VERTICAL MOTION
Assessing the discomfort of dual-axis whole-body vibration A77-50196
VERTIGO
Round window tear in aviators --- middle ear damage as aircraft accident cause A77-50762
VERY HIGH FREQUENCIES
Internal EM field and absorbed power density in human torsos induced by 1-500-MHz EM waves A77-49504
VESTIBULAR TESTS
Quantitative histochemistry of the vestibular cerebellum of the fish Fundulus heteroclitus flown aboard the biosatellite Cosmos-782 A77-49828
Antisomatogyral illusion --- perceived motion reversal after bodily rotation A77-49836
The ability to endure Coriolis force and some questions of vestibular choice A77-50923
Vestibular-visual interactions in flight simulators [NASA-CR-155200] N77-33847
VESTIBULES
Round window tear in aviators --- middle ear damage as aircraft accident cause A77-50762
Experiment M131. Human vestibular function N77-33791
VIBRATION EFFECTS
The functional state of an organism subjected to general low-frequency vibrations and impact acceleration A77-48462
Assessing the discomfort of dual-axis whole-body vibration A77-50196
VIBRATION PERCEPTION
Assessing the discomfort of dual-axis whole-body vibration A77-50196
VISIBILITY
Results of field experiments concerning visibility of objects [DLR-IB-553-77/3] N77-32730
The maximum detection range and the maximum recognition distance when observing ground targets from helicopters [DLR-IB-553-76/3] N77-33861
Some test results on the visibility of obstacle and hazard beacons [DLR-IB-553-76/5] N77-33862
VISORS
The helmet protects the aviator's head - Or does it A77-50660
VISUAL ACCOMMODATION
Effect of virtual image projection distance on the accommodative response of the eye A77-49830
VISUAL ACUITY
Prevention of visual anxiety and proficiency problems in the senior air transport pilot A77-49839

VISUAL DISCRIMINATION
Is the discrimination of motion-path length unique
A77-48023
Effect of emotional stress on recognition of visual patterns
A77-49835
VISUAL FIELDS
Perceived size and distance as a perceptual conflict between two processing modes
A77-48025
A computer controlled method for determining the fields of visual system neurons
A77-49273
VISUAL OBSERVATION
Visual light flash observations on Skylab 4
N77-33794
The maximum detection range and the maximum recognition distance when observing ground targets from helicopters
[DLR-IB-553-76/3] N77-33861
VISUAL PERCEPTION
Adaptation to displaced vision - Evidence for transfer of adaptation and long-lasting aftereffects
A77-48022
Delay of stimulus presentation after the saccade in visual search
A77-48024
Perceived size and distance as a perceptual conflict between two processing modes
A77-48025
Antisomatogyral illusion --- perceived motion reversal after bodily rotation
A77-49836
Effects of visual propioceptive cue conflicts on human tracking performance
[AD-A042006] N77-33860
Some test results on the visibility of obstacle and hazard beacons
[DLR-IB-553-76/5] N77-33862
VISUAL PIGMENTS
Evaluation of single-pigment shift model of anomalous trichromacy
A77-49308
VISUAL TASKS
The human operator in the search situation --- pattern recognition problems
A77-49673
The relationship between physiological parameters and performance in a compensatory tracking test to determine aptitude
A77-49924

W

WATER TEMPERATURE
Influence of water temperature on thermal, circulatory and respiratory responses to muscular work
A77-49923
WAVEFORMS
Distortion of non-invasive cardiac pulse curves - A capillary-damped pick-up and a calibration unit for apex cardiograms and other pulse curves
A77-48418
A model study of stroke values calculated from impedance and their relation to the waveform of blood flow
A77-49275
WEATHER
Reports from the German meteorological service. Volume 18, no. 142: The weather dependent yield of some shortliving food plants
[ISBN-3-88148-125-7] N77-32707
WEIGHT INDICATORS
Physiological mass measurements in Skylab
N77-33799
WEIGHTING FUNCTIONS
Mean skin temperature weighted with both ratios of heat transfer coefficient and body surface area --- human body-environment interactions
A77-51215
WEIGHTLESSNESS
Quantitative histochemistry of the vestibular cerebellum of the fish Fundulus heteroclitus flown aboard the biosatellite Cosmos-782
A77-49828
Rotational motion of an astronaut's trunk --- body attitude change by arm and leg motions in weightlessness
A77-50308
Reaction of the adrenal cortex and medulla to prolonged space flight in Wistar rats
[IAF PAPER 77-261] A77-51501
Some results of biological investigations aboard the biosatellite Cosmos-782
[IAF PAPER 77-262] A77-51502
The dependence of intraocular pressure and central artery collapse pressure upon weightlessness. Methodical approach to experiments during Spacelab flight
N77-32711
Biomedical results from Skylab
[NASA-SP-377] N77-33780
Skylab 2 crew observations and summary
N77-33784
Task and work performance on Skylab missions 2, 3, and 4: Time and motion study: Experiment M151
N77-33796
Crew efficiency on first exposure to zero-gravity
N77-33797
Physiological mass measurements in Skylab
N77-33799
The response of single human bells to zero-gravity
N77-33805
Lower body negative pressure: Third manned Skylab mission
N77-33809
Vectorcardiographic results from Skylab medical experiment M092: Lower body negative pressure
N77-33810
Hemodynamic studies of the legs under weightlessness
N77-33811
Anthropometric changes and fluid shifts
N77-33812
Vectorcardiographic changes during extended space flight (M093): Observations at rest and during exercise
N77-33813
Evaluation of the electromechanical properties of the cardiovascular system after prolonged weightlessness
N77-33814
Effect of prolonged space flight on cardiac function and dimensions
N77-33815
Results of Skylab medical experiment M171-metabolic activity
N77-33816
Lower body negative pressure device
N77-33821
Vectorcardiograph
N77-33824
Body temperature measuring system (M171)
N77-33828
WELDING
Evaluation of the potential retinal hazards from optical radiation generated by electric welding and cutting ARCS
[AD-A043023] N77-32710
WORKLOADS (PSYCHOPHYSIOLOGY)
The relationship between physiological parameters and performance in a compensatory tracking test to determine aptitude
A77-49924
WRIST
Muscular control during some voluntary motions with one degree of freedom. II - Multiple motions
A77-48320

X

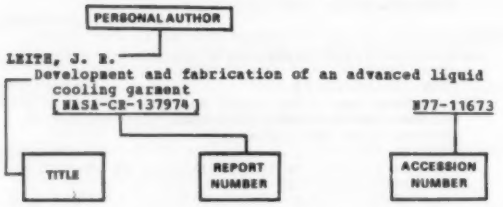
X RAY ANALYSIS
Automated chest X-ray analysis
[LA-UR-77-532] N77-33851
X RAY IRRADIATION
Reparative processes in spleen and peripheral blood after the outset of continuous irradiation
[IAF PAPER 77-266] A77-51506

Y

YIELD
Reports from the German meteorological service.
Volume 18, no. 142: The weather dependent yield
of some shortliving food plants
[ISBN-3-88148-125-7] W77-32707

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



The title of the document is used to provide the user with a brief description of the subject matter. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

ABBOTT, J. K.
Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system
A77-50631

ADEY, W. R.
Neurophysiological estimates of human performance capabilities in aerospace systems
[AD-A038208] N77-33849

AHLERS, I.
Plasma and tissue lipid changes in rats irradiated in cosmic space
[IAF PAPER 77-263] A77-51503

AHLERSOVA, E.
Plasma and tissue lipid changes in rats irradiated in cosmic space
[IAF PAPER 77-263] A77-51503

AKSENOV, V. V.
A study of the crew metabolic contribution into the space cabin atmosphere during space flights
[IAF PAPER 77-243] A77-51494

ALIUKHIN, IU. S.
Energetics of the heart during hypothermia
A77-50747

ANDERSON, C. D.
Stereo acuity and reconnaissance. Phase 2: Development of a Foveal-Parafoveal chromostereopsis test
[AD-A043258] N77-32719

ANSELM, V. J.
Feasibility study on the design of a probe for rectal cancer detection
[NASA-CR-155043] N77-32708

ANTIKOVA, V. A.
Respiration efficiency of athletes engaged in muscular activity of different intensity
A77-49441

ARTAMONOV, N. N.
Repeated examination in a low-pressure chamber of pilots with reduced ability to endure hypoxia
A77-50924

AUFFRET, R.
Estimate of the perceptive load by variability of rate of heartbeat
[AD-A042495] N77-32709

AYOUB, M. M.
Improved seat, console, and workplace design: Annotated bibliography, integration of the literature, accommodation model, and seated operator reach profiles
[AD-A040479] N77-33857

B

BAEV, V. I.
Acid-base equilibrium of rat blood during the combined action of hypercapnia, hypoxia and cooling
A77-50748

BAILEY, J. V.
Radiological protection and medical dosimetry for the Skylab crewmen
N77-33789

Visual light flash observations on Skylab 4
N77-33794

BAKER, J. T.
Changes in the Achilles tendon reflexes following Skylab missions
N77-33795

BANNISTER, J. R.
The objective evaluation of aircrew protective breathing equipment. I - Oxygen mask/goggles combinations. II - Fullface masks and hoods
A77-49927

The use of n-pentane as a tracer gas for the quantitative evaluation of aircrew protective breathing equipment
A77-49929

BARER, A. S.
The probability of decompression sickness as a result of going out in a pressure suit from a spacecraft with an atmosphere close to that on earth
[IAF PAPER A-77-41] A77-51519

BARNES, F. S.
Model for some nonthermal effects of radio and microwave fields on biological membranes
A77-49503

BECKWITH, G. W.
Impact of noise control at the workplace. Volumes 1 and 2, appendices A-G and volume 3, appendices H and I (econometric simulation)
[PB-268231/8] N77-32716

BEINHAUER, R.
Reports from the German meteorological service. Volume 18, no. 142: The weather dependent yield of some shortliving food plants
[ISBN-3-88148-125-7] N77-32707

BELAIA, N. A.
Problems of rehabilitation and recovery of altered physiological functions after space flight
[IAF PAPER 77-253] A77-51499

BELEDA, B. V.
Repeated examination in a low-pressure chamber of pilots with reduced ability to endure hypoxia
A77-50924

BELENEV, IU. B.
Some results of biological investigations aboard the biosatellite Cosmos-782
[IAF PAPER 77-262] A77-51502

BELL, R. L.
The Arctic personnel ambulatory anti-exposure system
A77-49939

BEREZOVSKII, V. IA.
Ecological aspects of respiratory physiology and hereditary variations in reactivity
A77-49437

BERGMAN, S. A., JR.
Lower body negative pressure: Third manned Skylab mission
N77-33809

Vectorcardiographic results from Skylab medical experiment M092: Lower body negative pressure
N77-33810

Evaluation of the electromechanical properties of the cardiovascular system after prolonged weightlessness
N77-33814

BERNAUER, E. M.
Cardiorespiratory responses to exercise after bed rest in men and women
A77-50444

BERNSTEIN, M.
Origins of serotonin innervation of forebrain structures
A77-51617

BERTHOZ, A.
Estimate of the perceptive load by variability of rate of heartbeat
[AD-A042495] N77-32709

BIKER, W. E.
Impact of noise control at the workplace. Volumes 1 and 2, appendices A-G and volume 3, appendices H and I (econometric simulation)
[PB-268231/8] N77-32716

BILOKRINITSKII, V. S.
Morphological and histochemical indices of compensatory adaptations in organs in response to oxygen insufficiency
A77-49444

BLACK, S.
Ultrastructural changes in tracheal epithelial cells exposed to oxygen
A77-49829

BLACKBURN, C. M.
Skylab experiment M131: Rotating little chair
N77-33830

BLACKBURN, H.
The exercise electrocardiogram in diagnosis
A77-49182

BLACKSHEAR, P. L., JR.
Fluid dynamics of blood cells and applications to hemodialysis
[PB-268346/4] N77-32713
Fluid dynamics of blood cells and applications to hemodialysis
[PB-268420/7] N77-32714

BLISS, D. B.
A review of methods for estimation of aeroacoustic loads on flight vehicle surface, volume 2
[AD-A042783] N77-32720

BOOHER, C. R.
Experiment M133. Sleep monitoring on Skylab
N77-33793
Hardware report for experiment M133, sleep monitoring on Skylab
N77-33829

BRAHMACHARI, H. D.
Hormonal changes under altitude stress
A77-47991

BRANTOVA, S. S.
Some aspects of energy metabolism in human blood erythrocytes under hypokinesia and during space flights
A77-49831

BRAUER, R. L.
Concepts for the generation, communication, and evaluation of habitability criteria
[AD-A041187] N77-32724
Development of an objective definition of habitability and a habitability data base
[AD-A041188] N77-32725

BRINKLEY, J. W.
USAFSAM evaluation of the Sierra Lightweight Helmet
A77-49952

BROCKETT, R. R.
Skylab environmental and crew microbiology studies
N77-33788

BROWN, D.
Vectorcardiographic changes during extended space flight (M093): Observations at rest and during exercise
N77-33813

BROWN, L. R.
Skylab oral health studies
N77-33786

BROWN, P. A.
Origins of serotonin innervation of forebrain structures
A77-51617

BRUCE, R. D.
Impact of noise control at the workplace. Volumes 1 and 2, appendices A-G and volume 3, appendices H and I (econometric simulation)
[PB-268231/8] N77-32716

BUCKENDORF, W. A.
Sarcoid and the heart - An aeromedical risk
A77-50758

BUCKLER, A. T.
A review of the literature on the legibility of alphanumerics on electronic displays
[AD-A040625] N77-33856

BUDERER, M. C.
Results of Skylab medical experiment M171-metabolic activity
N77-33816

BUELL, R. H.
Results of field experiments concerning visibility of objects
[DLR-IB-553-77/3] N77-32730
The maximum detection range and the maximum recognition distance when observing ground targets from helicopters
[DLR-IB-553-76/3] N77-33861
Some test results on the visibility of obstacle and hazard beacons
[DLR-IB-553-76/5] N77-33862

BURGIN, E. E.
Correlation of occurrence of aircraft accidents with biorhythmic criticality and cycle phase in U.S. Air Force, U.S. Army, and civil aviation pilots
A77-50763

C

CAMPBELL, A. F.
Operational requirements for aircrew antiexposure suits in the U.S. Navy
A77-49937

CANNON, M. W., JR.
A spatial frequency analysis model for predicting human performance at visual pattern matching tasks
[AD-A041649] N77-33859

CARHART, H. W.
Biological effect of fire suppression by nitrogen pressurization in enclosed environments
A77-50630

CARLSON, O. G.
Marginal alveolar bone loss in flying personnel - A radiographical followup study
A77-49827

CASEY, C. J.
Effect of ammonia on Swiss albino mice
A77-50635

CHAPANIS, A.
Limited vocabulary natural language dialogue
A77-49222

CHASSAY, C.
In-flight medical support system
N77-33832

CHEN, K.-M.
Internal EM field and absorbed power density in human torsos induced by 1-500-MHz EM waves
A77-49504

CHERNIAKOV, I. M.
The probability of decompression sickness as a result of going out in a pressure suit from a spacecraft with an atmosphere close to that on earth
[IAF PAPER A-77-41] A77-51519

CHISUM, G. T.
Effect of virtual image projection distance on the accommodative response of the eye
A77-49830

CLARK, B.
Vestibular-visual interactions in flight simulators
[NASA-CR-155200] N77-33847

COHEN, M. M.
Disorienting effects of aircraft catapult launchings. III - Cockpit displays and piloting performance
A77-49826

CONVERTINO, V. A.
Cardiorespiratory responses to exercise after bed rest in men and women
A77-50444

COOK, J. E.
The response of single human bells to zero-gravity
N77-33805
COOKE, J. P.
Pulsating seat cushion evaluation
A77-49940
Human compatibility testing of the RAF P/Q oxygen mask with the USAF HGU-2A/P flying helmet
A77-49942
CORREIA, M. J.
Antisomatogyral illusion
A77-49836
COSTELLO, M. J.
Vectorcardiograph
N77-33824
CRANE, C. R.
Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system
A77-50631
CROMRATH, D.
Human behavior in institutional fires and its design implications
[NBS-GCR-77-93] N77-33854
CUMMING, M. J.
The use of a behavioral response system in the USF/NASA toxicity screening test method
A77-50627
Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system
A77-50631
Variation in animal response to different toxicants
A77-50636
A review of available LC/50/ data
A77-50638
CUTCHEN, J. T.
Development of a helmet-mounted PLZT thermal/flash protection system
A77-49943
CUZZI, J.
Biostereometric analysis of body form
N77-33802
CYRUS, M. L.
Engineering and geographic constraints of a six degree of freedom synergistic platform motion system
[AD-A043194] N77-32728

D

DANIELS, P. D.
Cerebellar dynamics - The mossy fiber input
A77-49272
DANILOV, G. E.
Hemodynamics in the case of combining nociceptive stimulation with stimulation of the amygdaloid complex after acting upon the sensorimotor region of the cortex
A77-50746
DANILOV, L. N.
Functional changes in the respiratory system of dogs in the case of alveolar hypoxia with hypercapnia
A77-50749
DAVIS, J. G.
An acoustic transducer for application in kinetocardiography
A77-49274
DAVIS, T. A.
Development of an objective definition of habitability and a habitability data base
[AD-A041188] N77-32725
DELVALLE, P. F.
Evaluation of the potential retinal hazards from optical radiation generated by electric welding and cutting ARCS
[AD-A043023] N77-32710
DERGAL, N.
Studies on the relation between carboxyhemoglobin concentration and toxicity
A77-50761
DEROANNE, R.
Influence of water temperature on thermal, circulatory and respiratory responses to muscular work
A77-49923
DESTEIGUER, D.
The objective evaluation of aircrew protective breathing equipment. I - Oxygen mask/goggles combinations. II - Fullface masks and hoods
A77-49927
The use of n-pentane as a tracer gas for the quantitative evaluation of aircrew protective breathing equipment
A77-49929
DIAMOND, S.
Prevention of visual anxiety and proficiency problems in the senior air transport pilot
A77-49839
DICKSON, J. G., JR.
Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-O2 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/
A77-49834
DIETLEIN, L. F.
Biomedical results from Skylab
[NASA-SP-377] N77-33780
DISKALENKO, V. V.
The effect of prolonged hypokinesis on the function of the auditory analyzer
A77-48464
DMITRIEV, A. S.
Ontogenetic features of the reaction of adrenergic systems to hypergravity
A77-48479
DOBLAR, D. D.
Correlation between ventilatory and cerebrovascular responses to inhalation of CO
A77-49262
DOERRE, G. L.
Crew efficiency on first exposure to zero-gravity
N77-33797
DRAEGER, J.
The dependence of intraocular pressure and central artery collapse pressure upon weightlessness. Methodical approach to experiments during Spacelab flight
N77-32711
DRESSEL, D. L.
Concepts for the generation, communication, and evaluation of habitability criteria
[AD-A041187] N77-32724
DRESSLER, D. P.
Biological effect of fire suppression by nitrogen pressurization in enclosed environments
A77-50630
DRISCOLL, T. B.
Blood volume changes
N77-33806
DUBROVIN, L. M.
Some aspects of the clinical training of aviation physicians
A77-48461
DUNNE, M. J., JR.
Medical investigation of fatalities from aircraft-accident burns
A77-50760

E

EDELMAN, M. H.
Correlation between ventilatory and cerebrovascular responses to inhalation of CO
A77-49262
EGOROV, I. A.
Chlorophyll derivatives in modern soils in relation to the problem of the chemical evolution and origin of life on earth
A77-48034
ENDECOTT, B. R.
Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system
A77-50631
ENGLISH, R. A.
Radiological protection and medical dosimetry for the Skylab crewmen
N77-33789
EPSTEIN, S. E.
Effect of prolonged space flight on cardiac function and dimensions
N77-33815

EPSTEIN, W.
Is the discrimination of motion-path length unique
A77-48023
EVANS, J. S.
Skylab experiment M131: Rotating little chair
N77-33830
EVTUSHENKO, V. P.
Effect of emotional stress on recognition of visual patterns
A77-49835

F

FATRAS, H.
Estimate of the perceptive load by variability of rate of heartbeat
[AD-A042495] N77-32709
FAY, C. H.
Impact of noise control at the workplace. Volumes 1 and 2, appendices A-G and volume 3, appendices H and I (econometric simulation)
[PB-268231/8] N77-32716
FEDOROV, B. N.
Problems of rehabilitation and recovery of altered physiological functions after space flight
[IAF PAPER 77-253] A77-51499
FERGUSON, J. K.
Analysis of the Skylab flight crew health stabilization program
N77-33787
Skylab environmental and crew microbiology studies
N77-33788
FILIPENKOV, S. N.
The probability of decompression sickness as a result of going out in a pressure suit from a spacecraft with an atmosphere close to that on earth
[IAF PAPER A-77-41] A77-51519
FLOTTORP, G.
Noise induced hearing loss. Noise evaluation. The use of hearing protectors
[NTNF-4] N77-33852
FORSTROM, R. T.
Fluid dynamics of blood cells and applications to hemodialysis
[PB-268346/4] N77-32713
FOX, H. L.
Impact of noise control at the workplace. Volumes 1 and 2, appendices A-G and volume 3, appendices H and I (econometric simulation)
[PB-268231/8] N77-32716
FRAZER, R. E.
Feasibility study on the design of a probe for rectal cancer detection
[NASA-CR-155043] N77-32708
FRIBERG, L.
Toxicology of metals, volume 2
[PB-268324/1] N77-32715
FRIEDMAN, IG. O.
Local features in the lung of healthy subjects and in pulmonary pathology
A77-49438
FROLOV, M. V.
Effect of emotional stress on recognition of visual patterns
A77-49835
FROME, W. J.
Skylab oral health studies
N77-33786
FROST, J. D., JR.
Experiment M133. Sleep monitoring on Skylab
N77-33793
FURST, A.
Effect of ammonia on Swiss albino mice
A77-50635

G

GALAITSIS, A.
A review of methods for estimation of aeroacoustic loads on flight vehicle surface, volume 2
[AD-A042783] N77-32720
GANN, R. G.
Biological effect of fire suppression by nitrogen pressurization in enclosed environments
A77-50630
GARRIOTT, O. K.
Crew efficiency on first exposure to zero-gravity
N77-33797
GAZENKO, O. G.
Biomedical aspects of the mastering of outer space with the aid of remotely controlled devices
[IAF PAPER 77-242] A77-51493
GELFAND, R.
Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-O2 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/
A77-49834
GHISTA, D. N.
Finite element stress analysis of the human left ventricle whose irregular shape is developed from single plane cineangiocardiogram
A77-51260
GIBSON, E. G.
Skylab 4 crew observations
N77-33783
GOLAND, L. G.
Activity of the digestive system during 49-day antiorthostatic human hypokinesia
[NASA-TM-75177] N77-33846
GOLDBAUM, L. R.
Studies on the relation between carboxyhemoglobin concentration and toxicity
A77-50761
GOLDSTEIN, E. E.
Effect of prolonged space flight on cardiac function and dimensions
N77-33815
GOLLE, S. J.
Operational requirements for aircrew antiexposure suits in the U.S. Navy
A77-49937
GOLOVKIN, L. G.
The probability of decompression sickness as a result of going out in a pressure suit from a spacecraft with an atmosphere close to that on earth
[IAF PAPER A-77-41] A77-51519
GORSHUNOVA, A. I.
A study of the crew metabolic contribution into the space cabin atmosphere during space flights
[IAF PAPER 77-243] A77-51494
GOWEN, R. J.
Determination of cardiac size from chest roentgenograms following Skylab missions
N77-33819
GRAEFE, T. H.
Delay of stimulus presentation after the saccade in visual search
A77-48024
GRAVES, R. C.
Skylab environmental and crew microbiology studies
N77-33788
GRAY, G. W.
Renin, aldosterone, electrolyte, and cortisol responses to hypoxic decompression
A77-49261
GRAY, T. H.
The effects of system and environmental factors upon experienced pilot performance in the advanced simulator for pilot training
[AD-A043195] N77-32717
GRAYBIEL, A.
Evaluation of a new antinauseant drug for the prevention of motion sickness
A77-49837
Experiment M131. Human vestibular function
N77-33791
GREENLEAF, J. E.
Cardiorespiratory responses to exercise after bed rest in men and women
A77-50444
GRIFFIN, M. J.
Assessing the discomfort of dual-axis whole-body vibration
A77-50196
GRIFFITH, J. M.
Effect of prolonged space flight on cardiac function and dimensions
N77-33815
GRIGOREV, IU. G.
Plasma and tissue lipid changes in rats irradiated in cosmic space
[IAF PAPER 77-263] A77-51503

Influence of irradiation and space flight factors of nucleic acids and deoxyribonucleoprotein in liver and spleen of rat
[IAF PAPER 77-265] A77-51505

GRUNZKE, P. M.
The effects of system and environmental factors upon experienced pilot performance in the advanced simulator for pilot training
[AD-A043195] N77-32717

GUBENKO, V. V.
Some problems in cardiac electrokymography
A77-49446

GUEDRY, F. E., JR.
Antisomatogyral illusion
A77-49836

GURU, B. S.
Internal EM field and absorbed power density in human torsos induced by 1-500-MHz EM waves
A77-49504

H

HALCOMB, C. G.
Improved seat, console, and workplace design: Annotated bibliography, integration of the literature, accommodation model, and seated operator reach profiles
[AD-A040479] N77-33857

HALL, E. L.
Automated chest X-ray analysis
[LA-UR-77-532] N77-33851

HAMID, M. S.
Finite element stress analysis of the human left ventricle whose irregular shape is developed from single plane cineangiocardiogram
A77-51260

HAMILTON, B. W., JR.
Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-O2 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/
A77-49834

HANDLER, S.
Skylab oral health studies
N77-33786

HANK, J. M.
A.I.e. in-flight blood collection system
N77-33825

HANSEN, D. W.
Flexilevel adaptive testing paradigm: Validation in technical training
[AD-A042977] N77-32718

HANSON, S.
Is the discrimination of motion-path length unique
A77-48023

HARRIS, D. A.
Flexilevel adaptive testing paradigm: Validation in technical training
[AD-A042977] N77-32718

HARRIS, J. O., JR.
Development of a helmet-mounted PLZT thermal/flash protection system
A77-49943

HARRISON, G. A.
Ultrastructural changes in tracheal epithelial cells exposed to oxygen
A77-49829

HARTMAN, B. O.
Psychometric characteristics of astronauts
[AD-A039228] N77-33855

HASSUL, M.
Cerebellar dynamics - The mossy fiber input
A77-49272

HAVRON, M. D.
Experimental designs and psychometric techniques for the study of ride quality
[PB-268584/0] N77-32729

HAYFLICK, L.
The response of single human bells to zero-gravity
N77-33805

HEDGES, G. D.
The VTAS/helmet interface
A77-49941

HENRY, W. L.
Effect of prolonged space flight on cardiac function and dimensions
N77-33815

HERRON, R.
Biostereometric analysis of body form
N77-33802

HIGASHIYAMA, A.
Perceived size and distance as a perceptual conflict between two processing modes
A77-48025

HILADO, C. J.
The use of a behavioral response system in the USF/NASA toxicity screening test method
A77-50627

Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system
A77-50631

Effect of ammonia on Swiss albino mice
A77-50635

Variation in animal response to different toxicants
A77-50636

A review of available LC/50/ data
A77-50638

HILL, I. R.
Sarcoidosis - A review of some features of importance in aviation medicine
A77-50757

HLASTALA, M. P.
Influence of temperature on hemoglobin-ligand interaction in whole blood
A77-49263

HOFFLER, G. W.
Changes in the Achilles tendon reflexes following Skylab missions
N77-33795

Lower body negative pressure: Third manned Skylab mission
N77-33809

Vectorcardiographic results from Skylab medical experiment M092: Lower body negative pressure
N77-33810

Hemodynamic studies of the legs under weightlessness
N77-33811

Anthropometric changes and fluid shifts
N77-33812

Evaluation of the electromechanical properties of the cardiovascular system after prolonged weightlessness
N77-33814

Determination of cardiac size from chest roentgenograms following Skylab missions
N77-33819

HOFFMAN, R. A.
Radiological protection and medical dosimetry for the Skylab crewmen
N77-33789

Visual light flash observations on Skylab 4
N77-33794

HOFFMANN, H. E.
Results of field experiments concerning visibility of objects
[DLR-IB-553-77/3] N77-32730

The maximum detection range and the maximum recognition distance when observing ground targets from helicopters
[DLR-IB-553-76/3] N77-33861

Some test results on the visibility of obstacle and hazard beacons
[DLR-IB-553-76/5] N77-33862

HOFFMANN, H. J.
Interactive system design considerations
[PGIR2/76] N77-33863

HONICK, J. L.
Experiment M131. Human vestibular function
N77-33791

The effects of prolonged exposure to weightlessness on postural equilibrium
N77-33792

HOPKIN, V. D.
The controller and automation
A77-49223

HORDINSKY, J. R.
Skylab crew health: Crew surgeon's report
N77-33785

Changes in the Achilles tendon reflexes following Skylab missions
N77-33795

HORRIGAN, D. J., JR.
Metabolic cost of extravehicular activities
N77-33818

HU, C.-L. J.
Model for some nonthermal effects of radio and microwave fields on biological membranes
A77-49503
HUBBER, B.
The relationship between physiological parameters and performance in a compensatory tracking test to determine aptitude
A77-49924
HUBBERT, P. V.
Evaluation and disposition of Army helicopter aviators with finger amputations
A77-50756

I

IABULLIN, KH. KH.
Problems of rehabilitation and recovery of altered physiological functions after space flight
[IAF PAPER 77-253] A77-51499
IRISH, P. A., III
The effects of system and environmental factors upon experienced pilot performance in the advanced simulator for pilot training
[AD-A043195] N77-32717
ISAKOVA, L. S.
Hemodynamics in the case of combining nociceptive stimulation with stimulation of the amygdaloid complex after acting upon the sensorimotor region of the cortex
A77-50746
ITO, H.
A model study of stroke values calculated from impedance and their relation to the waveform of blood flow
A77-49275
ITO, K.
Learning process and nonlinear behavior of human operators in stabilizing unstable systems
A77-48491
ITO, M.
Learning process and nonlinear behavior of human operators in stabilizing unstable systems
A77-48491
IVANOV, E. A.
The proprioceptive contour as a linearizer of the eye movement system
A77-50806
IVANOVA, S. M.
Some aspects of energy metabolism in human blood erythrocytes under hypokinesia and during space flights
A77-49831
IZGACHOVA, T. I.
The functional state of the cardiovascular system with sinocarotid reflex
A77-49445

J

JACKSON, J. M.
Task and work performance on Skylab missions 2, 3, and 4: Time and motion study: Experiment M151
N77-33796
JACKSON, M. M.
Lower body negative pressure: Third manned Skylab mission
N77-33809
Vectorcardiographic results from Skylab medical experiment M092: Lower body negative pressure
N77-33810
JANOVA, E.
Reaction of the adrenal cortex and medulla to prolonged space flight in Wistar rats
[IAF PAPER 77-261] A77-51501
JANUSZ, W.
Vectorcardiographic changes during extended space flight (M093): Observations at rest and during exercise
N77-33813
JOHNSON, C.
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI annual meeting, volume 1
[PB-268094/0] N77-32712
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI Annual Meeting, volume 2
[PB-268095/7] N77-33853
JOHNSON, G. L.
The helmet protects the aviator's head - Or does it
A77-50660
JOHNSON, P. C.
Blood volume changes
N77-33806
JOHNSON, R. L.
Changes in the Achilles tendon reflexes following Skylab missions
N77-33795
Lower body negative pressure: Third manned Skylab mission
N77-33809
Vectorcardiographic results from Skylab medical experiment M092: Lower body negative pressure
N77-33810
Evaluation of the electromechanical properties of the cardiovascular system after prolonged weightlessness
N77-33814
Determination of cardiac size from chest roentgenograms following Skylab missions
N77-33819
JOHNSON, R. S.
Skylab medical program overview
N77-33781
JOHNSTON, R. S.
Biomedical results from Skylab
[NASA-SP-377] N77-33780
JOSEPH, S.
Hormonal changes under altitude stress
A77-47991

K

KABELNETSKII, M. S.
Some problems in cardiac electrokymography
A77-49446
KANAEV, N. N.
Functional changes in the respiratory system of dogs in the case of alveolar hypoxia with hypercapnia
A77-50749
KEANE, P. M.
Renin, aldosterone, electrolyte, and cortisol responses to hypoxic decompression
A77-49261
KELLAR, K. J.
Origins of serotonin innervation of forebrain structures
A77-51617
KELLY, M. J.
Limited vocabulary natural language dialogue
A77-49222
KENZIE, E. D.
Design and development of the Irvin 'Hitefinder' Automatic Parachute Ripcord Release
A77-49944
KERWIN, J. P.
Skylab 2 crew observations and summary
N77-33784
KEVANISHVILI, G. SH.
Functional relation between the spectrum of atmospheric electrical discharges and biological activity of living organisms
A77-49468
KIMZEY, S. L.
The response of single human bells to zero-gravity
N77-33805
Hematology and immunology studies
N77-33808
KING, P.
Vectorcardiographic changes during extended space flight (M093): Observations at rest and during exercise
N77-33813
KING, R. F.
Anthropomorphic master/slave manipulator system
[NASA-CASE-ARC-10756-1] N77-32721
KITAJIMA, T.
Continuous ECG monitoring on civil air crews during flight operations
A77-49838
KNAPP, C. F.
Response of the cardiovascular system to vibration and combined stresses
[AD-A039000] N77-33848

KNEPTON, J.
Evaluation of a new antinauseant drug for the prevention of motion sickness
A77-49837

KOLESNIKOV, M. P.
Chlorophyll derivatives in modern soils in relation to the problem of the chemical evolution and origin of life on earth
A77-48034

KOLINKO, A. I.
Mechanisms for the formation of rheoophthalograms and electroplethysmograms of the eye
A77-50745

KONARSKA, M.
Retention of selected physiological indicators in pilots in the course of agricultural flights [NASA-TT-F-17441] N77-33845

KONIGSBERG, H. L.
Skylab experiment M131: Rotating little chair
N77-33830

KORADECKA, D.
Retention of selected physiological indicators in pilots in the course of agricultural flights [NASA-TT-F-17441] N77-33845

KRAFT, C. L.
Stereo acuity and reconnaissance. Phase 2: Development of a Foveal-Parafoveal chronostereopsis test
[AD-A043258] N77-32719

KRAMOSIL, I.
Mechanized experiment planning in automaton-environment systems
A77-49335

KRASNOBAEV, P. E.
The functional state of the hypothalamus-pituitary-adrenal cortex system as a criterion for setting a standard for microwave radiation
A77-50922

KRASNOV, I. B.
Quantitative histochemistry of the vestibular cerebellum of the fish Fundulus heteroclitus flown aboard the biosatellite Cosmos-782
A77-49828

KRIAL, M. P.
Evaluation of the potential retinal hazards from optical radiation generated by electric welding and cutting ARCS
[AD-A043023] N77-32710

KROPACOVA, K.
Influence of irradiation and space flight factors of nucleic acids and deoxyribonucleoprotein in liver and spleen of rat
[IAF PAPER 77-265] A77-51505

KRUGER, H. P.
Automated chest X-ray analysis
[LA-UR-77-532] N77-33851

KRUPINA, T. N.
Problems of rehabilitation and recovery of altered physiological functions after space flight
[IAF PAPER 77-253] A77-51499

KUBIS, J. F.
Task and work performance on Skylab missions 2, 3, and 4: Time and motion study: Experiment M151
N77-33796

KURBATOVA, E. V.
The functional state of the cardiovascular system with sinocarotid reflex
A77-49445

KUZNETSOVA, L. A.
Effect of space flight factors on glycogen metabolic system and on ionic composition of rat skeletal muscle
[IAF PAPER 77-264] A77-51504

KVETNANSKY, R.
Reaction of the adrenal cortex and medulla to prolonged space flight in Wistar rats
[IAF PAPER 77-261] A77-51501

L

LACKNER, J. R.
Adaptation to displaced vision - Evidence for transfer of adaptation and long-lasting aftereffects
A77-48022

LAMBERTSEN, C. J.
Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-O2 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/
A77-49834

LARUE, R. P.
Hardware report for experiment M133, sleep monitoring on Skylab
N77-33829

LEACH, C. S.
Mineral and nitrogen metabolic studies, experiment M071
N77-33798

Biochemical responses of the Skylab crewmen: An overview
N77-33803

LEBEDEVA, E. S.
Functional changes in the respiratory system of dogs in the case of alveolar hypoxia with hypercapnia
A77-50749

LEBLANC, A. D.
Blood volume changes
N77-33806

LECROISSET, D. H.
Feasibility study on the design of a probe for rectal cancer detection
[NASA-CR-155043] N77-32708

LEEDS, M. F.
Prevention of visual anxiety and proficiency problems in the senior air transport pilot
A77-49839

LEM, J. D.
Results of Skylab medical experiment M171-metabolic activity
N77-33816

Ergometer
N77-33826

Metabolic analyzer
N77-33827

Body temperature measuring system (M171)
N77-33828

Exerciser
N77-33836

LEONTIUK, L. A.
Ontogenetic features of the reaction of adrenergic systems to hypergravity
A77-48479

LEPSKII, V. V.
A study of the crew metabolic contribution into the space cabin atmosphere during space flights
[IAF PAPER 77-243] A77-51494

LERUP, L.
Human behavior in institutional fires and its design implications
[NBS-GCR-77-93] N77-33854

LEVITSKII, O. E.
The problem of constructing bioamplifiers for dynamic biotelemetry studies
A77-50909

LINTOTT, J.
Vectorcardiograph
N77-33824

LITVINTSEV, A. I.
Muscular control during some voluntary motions with one degree of freedom. II - Multiple motions
A77-48320

LIU, J. K. C.
Human behavior in institutional fires and its design implications
[NBS-GCR-77-93] N77-33854

LOBANOV, N. M.
Use of a GL-5118 gas analyzer to measure the amount of oxygen consumption under conditions of increased pressure of the gaseous medium
A77-50750

LOCKHART, L. H.
Cytogenetic studies of blood, experiment M111
N77-33804

LOMIDZE, N. B.
Age-related changes in the mucopolysaccharide content in human coronary-artery walls
A77-49472

LOSEV, A. A.
Problems of ecological psychology during prolonged stay in sealed chambers
[IAF PAPER 77-244] A77-51495

LUBOWSKY, J.
A computer controlled method for determining the fields of visual system neurons
A77-49273
LUCZKOWSKI, S.
Carbon dioxide/dewpoint monitor
N77-33833
Skylab hardware report operational bioinstrumentation system
N77-33835
LUNIN, T. M.
The human operator in the search situation
A77-49673
LUNOV, G. N.
Some problems in cardiac electrokymography
A77-49446
LUTWAK, L.
Mineral and nitrogen metabolic studies, experiment M071
N77-33798
LYON, T. L.
Evaluation of the potential retinal hazards from optical radiation generated by electric welding and cutting ARCS
[AD-A043023] N77-32710

M

MACDOUGALL, J. A.
Round window tear in aviators
A77-50762
MACHADO, A. M.
Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system
A77-50631
MACHO, L.
The effect of prolonged space flight on liver enzyme activities and on lipogenesis in adipose tissue of rats
[IAF PAPER 77-267] A77-51507
MACKOVA, M.
Reparative processes in spleen and peripheral blood after the outset of continuous irradiation
[IAF PAPER 77-266] A77-51506
MADRID, J.
Origins of serotonin innervation of forebrain structures
A77-51617
MAGAZANIK, A.
Exercise and heat orthostatism and the effect of heat acclimation and physical fitness
A77-49833
MALIAREVKO, IU. IU.
The functional state of the cardiovascular system with sinocarotid reflex
A77-49445
MANN, W. A.
Compact artificial hand
[NASA-CASE-NPO-13906-1] N77-32723
MARIN, A. M.
Lung capacities of healthy subjects of different ages
A77-49439
MARKIEWICZ, L.
Retention of selected physiological indicators in pilots in the course of agricultural flights
[NASA-TT-F-17441] N77-33845
MARKIZOVA, N. P.
The functional state of the hypothalamus-pituitary-adrenal cortex system as a criterion for setting a standard for microwave radiation
A77-50922
MARSHALL, W. J.
Evaluation of the potential retinal hazards from optical radiation generated by electric welding and cutting ARCS
[AD-A043023] N77-32710
MASON, J. K.
Previous disease in aircrew killed in flying accidents
A77-50755
MATIUSHKIN, D. P.
Effect of postsynaptic factors on presynaptic nerve endings /functional feedbacks in the synapse/
A77-49370
MATSNEV, E. I.
Problems of rehabilitation and recovery of altered physiological functions after space flight
[IAF PAPER 77-253] A77-51499
MAZELIS, M.
Higher plant metabolism and energetics in hypogravity: Amino acid metabolism in higher plants
[NASA-CR-155198] N77-33840
MCBRIDE, G. H.
Task and work performance on Skylab missions 2, 3, and 4: Time and motion study: Experiment M151
N77-33796
MCCOLLUM, G. W.
Analysis of the Skylab flight crew health stabilization program
N77-33787
MCDANIEL, H. G.
Effect of heparin-induced free fatty acid elevation on myocardial oxygen consumption in man
A77-48481
MCFADDEN, E. B.
The objective evaluation of aircrew protective breathing equipment. I - Oxygen mask/goggles combinations. II - Fullface masks and hoods
A77-49927
The use of n-pentane as a tracer gas for the quantitative evaluation of aircrew protective breathing equipment
A77-49929
MCFADDEN, M.
Renin, aldosterone, electrolyte, and cortisol responses to hypoxic decompression
A77-49261
MCLAUGHLIN, E. J.
Task and work performance on Skylab missions 2, 3, and 4: Time and motion study: Experiment M151
N77-33796
MCMEEKIN, R. R.
Laboratory examination of unidentified suspected tissue fragments found at aircraft sites
A77-50754
Medical investigation of fatalities from aircraft-accident burns
A77-50760
Correlation of occurrence of aircraft accidents with biorhythmic criticality and cycle phase in U.S. Air Force, U.S. Army, and civil aviation pilots
A77-50763
MCNEE, R. C.
Psychometric characteristics of astronauts
[AD-A039228] N77-33855
MEHLER, W. R.
Origins of serotonin innervation of forebrain structures
A77-51617
MELIKHOVA, T. V.
Tissue respiration features in white rats exhibiting high and low resistance to hypoxia
A77-49443
MELVIN, J. W.
Tolerance and response of the knee-femur-pelvis complex to axial impact
[PB-269059/2] N77-33864
MENGEL, C. E.
Red cell metabolism studies on Skylab
N77-33807
MEROZ, A.
Exercise and heat orthostatism and the effect of heat acclimation and physical fitness
A77-49833
MIASNIKOV, V. I.
Biomedical aspects of the mastering of outer space with the aid of remotely controlled devices
[IAF PAPER 77-242] A77-51493
Problems of ecological psychology during prolonged stay in sealed chambers
[IAF PAPER 77-244] A77-51495
MICHEL, E. L.
Results of Skylab medical experiment M171-metabolic activity
N77-33816
Pulmonary function evaluation during and following Skylab space flights
N77-33817
MIESZKUC, B. J.
Skylab environmental and crew microbiology studies
N77-33788

MIKOS, K. N.
A study of the crew metabolic contribution into the space cabin atmosphere during space flights [IAF PAPER 77-243] A77-51494
MILLER, E. F., II
Experiment M131. Human vestibular function N77-33791
The effects of prolonged exposure to weightlessness on postural equilibrium N77-33792
MIRUSHCHENKO, I. I.
The functional state of the cardiovascular system with sinocarotid reflex A77-49445
MISUROVA, E.
Influence of irradiation and space flight factors of nucleic acids and deoxyribonucleoprotein in liver and spleen of rat [IAF PAPER 77-265] A77-51505
MOCHIDA, T.
Mean skin temperature weighted with both ratios of heat transfer coefficient and body surface area A77-51215
MONTGOMERY, L. D.
An electrode system for tetrapolar electrical impedance plethysmography of the finger A77-51616
MONTGOMERY, P. O., JR.
The response of single human bells to zero-gravity N77-33805
MOODY, D. L., JR.
An electrode system for tetrapolar electrical impedance plethysmography of the finger A77-51616
MORASKI, R. E.
Effect of heparin-induced free fatty acid elevation on myocardial oxygen consumption in man A77-48481
MORGAN, T. E.
Efficiency of the oxygen mask delivery system at the USAF hyperbaric center A77-49928
Pulsating seat cushion evaluation A77-49940
MORWAY, P. E.
Effect of virtual image projection distance on the accommodative response of the eye A77-49830
MULLIGAN, E. F.
USAFSAM evaluation of the Sierra Lightweight Helmet A77-49952
MURASHOV, B. F.
The functional state of the hypothalamus-pituitary-adrenal cortex system as a criterion for setting a standard for microwave radiation A77-50922
MURGAS, K.
Reaction of the adrenal cortex and medulla to prolonged space flight in Wistar rats [IAF PAPER 77-261] A77-51501
MUSGRAVE, F. S.
Flight control experiences N77-33782

N

NANDI, P. S.
Recovery from exercise at varying work loads - Time course of responses of heart rate and systolic intervals A77-48417
NAZARENKO, A. I.
Tissue respiration features in white rats exhibiting high and low resistance to hypoxia A77-49443
NEFEDOV, IU. G.
A study of the crew metabolic contribution into the space cabin atmosphere during space flights [IAF PAPER 77-243] A77-51494
NEKRASOV, V. P.
Biomedical aspects of the mastering of outer space with the aid of remotely controlled devices [IAF PAPER 77-242] A77-51493
NELSON, J. B.
Antisomatogyral illusion A77-49836
NEMETH, S.
The effect of prolonged space flight on liver enzyme activities and on lipogenesis in adipose tissue of rats [IAF PAPER 77-267] A77-51507
NESTEROV, V. P.
Effect of space flight factors on glycogen metabolic system and on ionic composition of rat skeletal muscle [IAF PAPER 77-264] A77-51504
NEUMAN, P.
Application of optimal and adaptive algorithm control to the system robot-manipulator in cosmic space [IAF PAPER 77-ST-02] A77-51567
NICOGOSSIAN, A. E.
Changes in the Achilles tendon reflexes following Skylab missions N77-33795
Lower body negative pressure: Third manned Skylab mission N77-33809
Vectorcardiographic results from Skylab medical experiment M092: Lower body negative pressure N77-33810
Pulmonary function evaluation during and following Skylab space flights N77-33817
Determination of cardiac size from chest roentgenograms following Skylab missions N77-33819
NILSSON, K.
Distortion of non-invasive cardiac pulse curves - A capillary-damped pick-up and a calibration unit for apex cardiograms and other pulse curves A77-48418
NOLTE, R. W.
Lower body negative pressure device N77-33821
Automatic blood pressure measuring system (M092) N77-33823
NOVIKOV, N. A.
Problems of ecological psychology during prolonged stay in sealed chambers [IAF PAPER 77-244] A77-51495
NOVITSKII, A. A.
The functional state of the hypothalamus-pituitary-adrenal cortex system as a criterion for setting a standard for microwave radiation A77-50922

O

OIGENBLICK, E. A.
Some results of biological investigations aboard the biosatellite Cosmos-782 [IAF PAPER 77-262] A77-51502
OLEFIRENKO, V. T.
Problems of rehabilitation and recovery of altered physiological functions after space flight [IAF PAPER 77-253] A77-51499
OLKHOVENKO, V. P.
Some results of biological investigations aboard the biosatellite Cosmos-782 [IAF PAPER 77-262] A77-51502
ORD, J.
Physiological mass measurements in Skylab N77-33799
ORELLANO, T.
Studies on the relation between carboxyhemoglobin concentration and toxicity A77-50761
OSBORNE, W. Z.
Visual light flash observations on Skylab 4 N77-33794
OVCHINNIKOVA, L. M.
Acid-base equilibrium of rat blood during the combined action of hypercapnia, hypoxia and cooling A77-50748

P

PACKHAM, S. C.
The use of a behavioral response system in the USF/NASA toxicity screening test method A77-50627

PALKOVIC, M.
The effect of prolonged space flight on liver enzyme activities and on lipogenesis in adipose tissue of rats
[IAF PAPER 77-267] A77-51507
PALMER, H. E.
Investigate methods for measuring muscle and bone mass changes in astronauts and animals which occur during space flight
[NASA-CR-151518] N77-33837
PAOLONE, A. M.
Metabolic responses to exercise in three thermal environments
A77-50764
PARFIONOV, G. P.
Some results of biological investigations aboard the biosatellite Cosmos-782
[IAF PAPER 77-262] A77-51502
PASQUET, J.
Emergency medical kits aboard aircraft
A77-49840
PAUL, J. S.
The response of single human hells to zero-gravity
N77-33805
PAULIKOVA, E.
Plasma and tissue lipid changes in rats irradiated in cosmic space
[IAF PAPER 77-263] A77-51503
PAVLOV, A. S.
Changes in energy consumption rate and respiratory functions of athletes subjected to thermal stress
A77-49442
PETERSON, R.
Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-O2 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/
A77-49834
PETIT, J. M.
Influence of water temperature on thermal, circulatory and respiratory responses to muscular work
A77-49923
PETROV, N. S.
The functional state of an organism subjected to general low-frequency vibrations and impact acceleration
A77-48462
PETTY, A. E.
Laboratory examination of unidentified suspected tissue fragments found at aircraft sites
A77-50754
PETTYJOHN, F. S.
Sarcoid and the heart - An aeromedical risk
A77-50758
PFOFF, B. J.
Development of a helmet-mounted PLZT thermal/flash protection system
A77-49943
PHILPOTT, D. E.
Ultrastructural changes in tracheal epithelial cells exposed to oxygen
A77-49829
PINKEL, B.
A review of methods for estimation of aeroacoustic loads on flight vehicle surface, volume 2
[AD-A042783] N77-32720
PINSKI, M. S.
The objective evaluation of aircrew protective breathing equipment. I - Oxygen mask/goggles combinations. II - Fullface masks and hoods
A77-49927
The use of n-pentane as a tracer gas for the quantitative evaluation of aircrew protective breathing equipment
A77-49929
PINSKY, L. S.
Visual light flash observations on Skylab 4
N77-33794
PIRNAY, F.
Influence of water temperature on thermal, circulatory and respiratory responses to muscular work
A77-49923
PLATONOVA, R. N.
Some results of biological investigations aboard the biosatellite Cosmos-782
[IAF PAPER 77-262] A77-51502
POKORNY, J.
Evaluation of single-pigment shift model of anomalous trichromacy
A77-49308
POPOV, B. O.
The human operator in the search situation
A77-49673
PORTNOY, B. L.
Analysis of the Skylab flight crew health stabilization program
N77-33787
POSPISIL, M.
On the possibilities of prediction of differences in radiation resistance of individuals
[IAF PAPER 77-250] A77-51498
PRASLICKA, M.
Plasma and tissue lipid changes in rats irradiated in cosmic space
[IAF PAPER 77-263] A77-51503
Influence of irradiation and space flight factors of nucleic acids and deoxyribonucleoprotein in liver and spleen of rat
[IAF PAPER 77-265] A77-51505
Reparative processes in spleen and peripheral blood after the outset of continuous irradiation
[IAF PAPER 77-266] A77-51506
PUGLIA, C.
Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-O2 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/
A77-49834
PUSHKARCHUK, A. A.
Ontogenetic features of the reaction of adrenergic systems to hypergravity
A77-48479

Q

QUIST-HANSEN, S.
Noise induced hearing loss. Noise evaluation. The use of hearing protectors
[NTNF-4] N77-33852

R

RACKLEY, C. E.
Effect of heparin-induced free fatty acid elevation on myocardial oxygen consumption in man
A77-48481
RADHAKRISHNAN, U.
Hormonal changes under altitude stress
A77-47991
RAEV, S. P.
Repeated examination in a low-pressure chamber of pilots with reduced ability to endure hypoxia
A77-50924
RAMACHANDRAN, K.
Hormonal changes under altitude stress
A77-47991
RAMBAUT, P. C.
Mineral and nitrogen metabolic studies, experiment M071
N77-33798
Bone mineral measurement: Experiment M078
N77-33800
Biochemical responses of the Skylab crewmen: An overview
N77-33803
READER, D. C.
Some influences of restraint harness design on accident pathology
A77-50751
REDWOOD, D. R.
Effect of prolonged space flight on cardiac function and dimensions
N77-33815
REED, L. E.
Effects of visual propioceptive cue conflicts on human tracking performance
[AD-A042006] N77-33860
REID, J.
Mineral and nitrogen metabolic studies, experiment M071
N77-33798
REPCHKOVA, D.
Reaction of the adrenal cortex and medulla to prolonged space flight in Wistar rats
[IAF PAPER 77-261] A77-51501

RESCHKE, M. F.
The effects of prolonged exposure to weightlessness on postural equilibrium
N77-33792

REYNOLDS, R. C.
The response of single human bells to zero-gravity
N77-33805

RIDER, L. J.
Skylab oral health studies
N77-33786

RIPPSTEIN, W. J., JR.
Toxicological aspects of the Skylab program
N77-33790

ROBBINS, D. H.
Guidebook on anthropomorphic test dummy usage
[PB-268904/0] N77-33865

ROBINETTE, J. L.
Bibliography of research reports and publications: Impact, vibration, windblast and escape, 1942 - 1976
[AD-A042201] N77-33850

ROBINSON, H. S.
Biological effect of fire suppression by nitrogen pressurization in enclosed environments
A77-50630

ROGERS, T.
The response of single human bells to zero-gravity
N77-33805

ROGERS, W. J.
Effect of heparin-induced free fatty acid elevation on myocardial oxygen consumption in man
A77-48481

ROMANENKO, V. O.
Changes in energy consumption rate and respiratory functions of athletes subjected to thermal stress
A77-49442

ROSE, S. A.
In-flight medical support system
N77-33832

ROSEBORO, J. A.
Feasibility study on the design of a probe for rectal cancer detection
[NASA-CR-155043] N77-32708

ROSS, S.
Flexilevel adaptive testing paradigm: Validation in technical training
[AD-A042977] N77-32718

ROSTOPSHINA, A. V.
Some results of biological investigations aboard the biosatellite Cosmos-782
[IAF PAPER 77-262] A77-51502

ROUGE, B. K.
Automated chest X-ray analysis
[LA-UR-77-532] N77-33851

RUDENKO, V. V.
The human operator in the search situation
A77-49673

RUSSEL, J. A.
Muscular deconditioning and its prevention in space flight
N77-33801

Anthropometric changes and fluid shifts
N77-33812

Results of Skylab medical experiment M171-metabolic activity
N77-33816

Pulmonary function evaluation during and following Skylab space flights
N77-33817

RUSNAK, R.
Task and work performance on Skylab missions 2, 3, and 4: Time and motion study: Experiment M151
N77-33796

RUSSELL, R. O., JR.
Effect of heparin-induced free fatty acid elevation on myocardial oxygen consumption in man
A77-48481

RYZHKOVA, V. V.
A study of the crew metabolic contribution into the space cabin atmosphere during space flights
[IAF PAPER 77-243] A77-51494

S

SALAMY, J. G.
Experiment M133. Sleep monitoring on Skylab
N77-33793

SANDERS, D. C.
Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system
A77-50631

SANFORD, D. D.
Mineral and nitrogen metabolic studies, experiment M071
N77-33798

SANTIAGO, T. V.
Correlation between ventilatory and cerebrovascular responses to inhalation of CO
A77-49262

SAVINA, V. P.
A study of the crew metabolic contribution into the space cabin atmosphere during space flights
[IAF PAPER 77-243] A77-51494

SAWIN, C. F.
Results of Skylab medical experiment M171-metabolic activity
N77-33816

Pulmonary function evaluation during and following Skylab space flights
N77-33817

SAXON, S. V.
Task and work performance on Skylab missions 2, 3, and 4: Time and motion study: Experiment M151
N77-33796

SCHACHTER, A. P.
Pulmonary function evaluation during and following Skylab space flights
N77-33817

SCHEUCH, K.
The relationship between physiological parameters and performance in a compensatory tracking test to determine aptitude
A77-49924

SCHNEIDER, H. J.
Toxicological aspects of the Skylab program
N77-33790

SCHNEIDER, J. E.
Comparison of animal responses to the combustion products generated by two test procedures, the USF/NASA methodology and the FAA/CAMI system
A77-50631

SCHREINICKE, G.
The relationship between physiological parameters and performance in a compensatory tracking test to determine aptitude
A77-49924

SCHUMATE, W. H.
Experiment M133. Sleep monitoring on Skylab
N77-33793

SEARS, W. J.
USAFSAM evaluation of the Sierra Lightweight Helmet
A77-49952

SEKIGUCHI, C.
Continuous ECG monitoring on civil air crews during flight operations
A77-49838

SEREBROVSKA, T. V.
Age differences in human external respiration response to hyperoxic and hypoxic gas mixtures
A77-49440

SERIS, H.
Estimate of the perceptive load by variability of rate of heartbeat
[AD-A042495] N77-32709

SEROPIAN, M. S.
Muscular control during some voluntary motions with one degree of freedom. II - Multiple motions
A77-48320

SHALIMOV, P. M.
The significance of a psychophysiological norm for flying time for the medical safeguarding of flights
A77-48463

SHANNON, A. V.
Experiment support system
N77-33831

Atmospheric analyzer, carbon monoxide monitor and toluene diisocyanate monitor
N77-33834

SHAPIRO, IA. M.
Rotational motion of an astronaut's trunk
A77-50308

SHAPIRO, Y.
Exercise and heat orthostatism and the effect of heat acclimation and physical fitness
A77-49833
SHCHERBACHEV, I. P.
Acid-base equilibrium of rat blood during the combined action of hypercapnia, hypoxia and cooling
A77-50748
SHEFFIELD, P. J.
Efficiency of the oxygen mask delivery system at the USAF hyperbaric center
A77-49928
SHEIKIN, A. A.
The probability of decompression sickness as a result of going out in a pressure suit from a spacecraft with an atmosphere close to that on earth
[IAF PAPER A-77-41] A77-51519
SHOENFELD, Y.
Exercise and heat orthostatism and the effect of heat acclimation and physical fitness
A77-49833
SHORE, M.
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI annual meeting, volume 1
[PB-268094/0] N77-32712
Biological effects of electromagnetic waves. Selected papers of the USNC/URSI Annual Meeting, volume 2
[PB-268095/7] N77-33853
SHULZ, W. W.
The response of single human bells to zero-gravity
N77-33805
SHVARTZ, E.
Exercise and heat orthostatism and the effect of heat acclimation and physical fitness
A77-49833
SIEGEL, S. M.
Study of metabolism and energetics in hypogravity: Degenerative effects of prolonged hypogravity
[NASA-CR-155199] N77-33839
SIMON, C. W.
Response surface methodology revisited: A commentary on research strategy
[AD-A043242] N77-32726
SIMONOV, P. V.
Effect of emotional stress on recognition of visual patterns
A77-49835
SLINEY, D. H.
Evaluation of the potential retinal hazards from optical radiation generated by electric welding and cutting ARCS
[AD-A043023] N77-32710
SMIRNOV, K. V.
Activity of the digestive system during 49-day antiorthostatic human hypokinesia
[NASA-TM-75177] N77-33846
SMITH, M. C., JR.
Mineral and nitrogen metabolic studies, experiment M071
N77-33798
Bone mineral measurement: Experiment M078
N77-33800
SMITH, R. F.
Vectorcardiographic changes during extended space flight (M093): Observations at rest and during exercise
N77-33813
SMITH, S. D.
Femoral development in chronically centrifuged rats
A77-49832
SMITH, V. C.
Evaluation of single-pigment shift model of anomalous trichromacy
A77-49308
SMOKLER, M. I.
Feasibility study on the design of a probe for rectal cancer detection
[NASA-CR-155043] N77-32708
SMYTH, C.
Computing internal cockpit reflections of external point-light sources for the Model 209 Ah-1-S helicopter flat-plate canopy design
[AD-A043120] N77-32727
SMYTH, C. C.
Investigation of inside light reflection problem on the Flat Plate Canopy (FPC) for model 209 AH-IS helicopter
[AD-A041332] N77-33858
SNYDER, M. E.
The VTAS/helmet interface
A77-49941
SPODICK, D. H.
Recovery from exercise at varying work loads - Time course of responses of heart rate and systolic intervals
A77-48417
SPOOR, D. H.
Sarcoid and the heart - An aeromedical risk
A77-50758
STADLER, C. R.
Mineral and nitrogen metabolic studies, experiment M071
N77-33798
STALNAKER, R. L.
Tolerance and response of the knee-femur-pelvis complex to axial impact
[PB-269059/2] N77-33864
STANTON, K.
Vectorcardiographic changes during extended space flight (M093): Observations at rest and during exercise
N77-33813
STEPANOVA, S. I.
Current problems in space biorhythmology
A77-50686
STOCK, D.
The response of single human bells to zero-gravity
N77-33805
STONE, J. P.
Biological effect of fire suppression by nitrogen pressurization in enclosed environments
A77-50630
STOOP, D.
Vectorcardiographic changes during extended space flight (M093): Observations at rest and during exercise
N77-33813
STORK, M. L.
Efficiency of the oxygen mask delivery system at the USAF hyperbaric center
A77-49928
Human compatibility testing of the RAF P/Q oxygen mask with the USAF HGU-2A/P flying helmet
A77-49942
STOWELL, H. R.
Investigation of inside light reflection problem on the Flat Plate Canopy (FPC) for model 209 AH-IS helicopter
[AD-A041332] N77-33858
STRAUSS, H.
Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-02 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/
A77-49834
STRBAK, V.
The effect of prolonged space flight on liver enzyme activities and on lipogenesis in adipose tissue of rats
[IAF PAPER 77-267] A77-51507
STREMEL, R. W.
Cardiorespiratory responses to exercise after bed rest in men and women
A77-50444
SUTTON, J. R.
Renin, aldosterone, electrolyte, and cortisol responses to hypoxic decompression
A77-49261
SVENSON, O. H.
The human operator in the search situation
A77-49673
SVIRIDOV, E. P.
Effect of emotional stress on recognition of visual patterns
A77-49835

T

TAIRBEKOV, M. G.
Some results of biological investigations aboard the biosatellite Cosmos-782
[IAF PAPER 77-262] A77-51502

TAYLOR, G. R.
Skylab environmental and crew microbiology studies
N77-33788
TEPLOV, S. I.
Mechanisms of neurogenic vasodilation
A77-49371
TEPPER, R. H.
Regenerable device for scrubbing breathable air of CO2 and moisture without special heat exchanger equipment
[NASA-CASE-MSC-14771-1] N77-32722
TER-ANTONIANTS, S. A.
The functional state of the cardiovascular system with sinocarotid reflex
A77-49445
THIROLF, R. G.
The response of single human bells to zero-gravity
N77-33805
THOMPSON, R. L.
Cause of death in aircraft accidents - Drowning vs. traumatic injuries
A77-50753
THORNTON, W. E.
Physiological mass measurements in Skylab
N77-33799
Muscular deconditioning and its prevention in space flight
N77-33801
Hemodynamic studies of the legs under weightlessness
N77-33811
Anthropometric changes and fluid shifts
N77-33812
TIGRANIAN, R. A.
Reaction of the adrenal cortex and medulla to prolonged space flight in Wistar rats
[IAF PAPER 77-261] A77-51501
TIGRANIAN, R. A.
Plasma and tissue lipid changes in rats irradiated in cosmic space
[IAF PAPER 77-263] A77-51503
Influence of irradiation and space flight factors of nucleic acids and deoxyribonucleoprotein in liver and spleen of rat
[IAF PAPER 77-265] A77-51505
The effect of prolonged space flight on liver enzyme activities and on lipogenesis in adipose tissue of rats
[IAF PAPER 77-267] A77-51507
TINGLEY, D. B.
Round window tear in aviators
A77-50762
TINNA, N. T.
The human operator in the search situation
A77-49673
TOGAWA, T.
A model study of stroke values calculated from impedance and their relation to the waveform of blood flow
A77-49275
TORDA, T.
Reaction of the adrenal cortex and medulla to prolonged space flight in Wistar rats
[IAF PAPER 77-261] A77-51501
TREANOR, J. J.
The helmet protects the aviator's head - Or does it
A77-50660
TURNBILL, C.
Ultrastructural changes in tracheal epithelial cells exposed to oxygen
A77-49829
TWIGG, D. W.
PROMETHEUS 2: A user oriented program for human crash dynamics
[PB-269305/9] N77-33866

U

UEDA, Y.
Continuous ECG monitoring on civil air crews during flight operations
A77-49838
UNDERWOOD GROUND, K. E.
Ischaemic heart disease - A problem in aircraft accident reconstruction
A77-50759
UNGAR, E. E.
A review of methods for estimation of aeroacoustic loads on flight vehicle surface, volume 2
[AD-A042783] N77-32720
USACHEV, V. V.
The ability to endure Coriolis force and some questions of vestibular choice
A77-50923
USHAKOV, A. S.
Some aspects of energy metabolism in human blood erythrocytes under hypokinesia and during space flights
A77-49831

V

VALLOTTON, W. C.
Anthropomorphic master/slave manipulator system
[NASA-CASE-ARC-10756-1] N77-32721
VANNORDSTRAND, P. C.
Space shuttle life sciences requirements development and documentation
[NASA-CR-151529] N77-33838
VASILEV, A. I.
The effect of prolonged hypokinesis on the function of the auditory analyzer
A77-48464
VASILEVA, E. D.
Characteristics of fatty acid metabolism in mammals during fasting
A77-49372
VAUGHAN, J.
Delay of stimulus presentation after the saccade in visual search
A77-48024
VERNIKOS-DANELLIS, J.
Origins of serotonin innervation of forebrain structures
A77-51617
VIAZITSKII, P. O.
The functional state of an organism subjected to general low-frequency vibrations and impact acceleration
A77-48462
VIOL, G. W.
Renin, aldosterone, electrolyte, and cortisol responses to hypoxic decompression
A77-49261
VOGEL, J. M.
Bone mineral measurement: Experiment M078
N77-33800
VYKUKAL, H. C.
Anthropomorphic master/slave manipulator system
[NASA-CASE-ARC-10756-1] N77-32721

W

WALIGORA, J. M.
Metabolic cost of extravehicular activities
N77-33818
WALLENTIN, I.
Distortion of non-invasive cardiac pulse curves - A capillary-damped pick-up and a calibration unit for apex cardiograms and other pulse curves
A77-48418
WATERS, B. K.
The effects of system and environmental factors upon experienced pilot performance in the advanced simulator for pilot training
[AD-A043195] N77-32717
WATHEN, R. L.
Fluid dynamics of blood cells and applications to hemodialysis
[PB-268420/7] N77-32714
WEINSTOCK, L. I.
Double knit aramid flight suits for aircrewmen
A77-49938
WELLS, C. L.
Metabolic responses to exercise in three thermal environments
A77-50764
WESTIN, R. A.
Experimental designs and psychometric techniques for the study of ride quality
[PB-268584/0] N77-32729
WHEATCROFT, M. G.
Skylab oral health studies
N77-33786

WHEDON, G. D.
Mineral and nitrogen metabolic studies, experiment M071
N77-33798

WHITMAN, N. E.
Assessing the discomfort of dual-axis whole-body vibration
A77-50196

WHITTLE, M. W.
Mineral and nitrogen metabolic studies, experiment M071
N77-33798
Bone mineral measurement: Experiment M078
N77-33800
Biostereometric analysis of body form
N77-33802

WIKER, G. A.
Compact artificial hand
[NASA-CASE-MFO-13906-1]
N77-32723

WIKSTRAND, J.
Distortion of non-invasive cardiac pulse curves - A capillary-damped pick-up and a calibration unit for apex cardiograms and other pulse curves
A77-48418

WILBY, J. F.
A review of methods for estimation of aeroacoustic loads on flight vehicle surface, volume 2
[AD-A042783]
N77-32720

WILLIAMS, B. A.
An electrode system for tetrapolar electrical impedance plethysmography of the finger
A77-51616

WILLIAMS, F. W.
Biological effect of fire suppression by nitrogen pressurization in enclosed environments
A77-50630

WOLCOTT, J. H.
Correlation of occurrence of aircraft accidents with biorhythmic criticality and cycle phase in U.S. Air Force, U.S. Army, and civil aviation pilots
A77-50763

WOODSON, R. D.
Influence of temperature on hemoglobin-ligand interaction in whole blood
A77-49263

WRAMME, B.
Influence of temperature on hemoglobin-ligand interaction in whole blood
A77-49263

WRIGHT, W. B.
Human tolerance to He, Ne, and N2 at respiratory gas densities equivalent to He-O2 breathing at depths to 1200, 2000, 3000, 4000, and 5000 feet of sea water /Predictive Studies III/
A77-49834

Y

YACHZEL, B. B.
Adaptation to displaced vision - Evidence for transfer of adaptation and long-lasting aftereffects
A77-48022

YAMAGUCHI, O.
Continuous ECG monitoring on civil air crews during flight operations
A77-49838

YAMAMOSHI, K.-I.
A model study of stroke values calculated from impedance and their relation to the waveform of blood flow
A77-49275

YANOWITCH, R. E.
Crew behavior in accident causation
A77-50752
Correlation of occurrence of aircraft accidents with biorhythmic criticality and cycle phase in U.S. Air Force, U.S. Army, and civil aviation pilots
A77-50763

Z

ZACKRISSON, K.
Marginal alveolar bone loss in flying personnel - A radiographical followup study
A77-49827

ZELIKSON, B. B.
Mechanisms for the formation of rheoophthalograms and electroplethysmograms of the eye
A77-50745

ZENBER, R. J.
Bibliography of research reports and publications: Impact, vibration, windblast and escape, 1942 - 1976
[AD-A042201]
N77-33850

ZHELUDKOVA, Z. P.
Effect of space flight factors on glycogen metabolic system and on ionic composition of rat skeletal muscle
[IAF PAPER 77-264]
A77-51504

ZHERNAVKOV, V. F.
The significance of a psychophysiological norm for flying time for the medical safeguarding of flights
A77-48463

ZHGENTI, T. G.
Functional relation between the spectrum of atmospheric electrical discharges and biological activity of living organisms
A77-49468

ZHUKOVSKII, L. I.
Local features in the lung of healthy subjects and in pulmonary pathology
A77-49438

ZITTERKOPF, D. L.
Skylab experiment M131: Rotating little chair
N77-33830

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NASA SP-7011 (175)		

4. Title and Subtitle	5. Report Date
AEROSPACE MEDICINE AND BIOLOGY A Continuing Bibliography (Supplement 175)	January 1978
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
	10. Work Unit No.
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, DC 20546	11. Contract or Grant No.
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This bibliography lists 239 reports, articles, and other documents introduced into the NASA scientific and technical information system in December 1977.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Aerospace Medicine Bibliographies Biological Effects	Unclassified - Unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	80	$4.75 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1978

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to ten special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley
COLORADO
University of Colorado, Boulder
DISTRICT OF COLUMBIA
Library of Congress
GEORGIA
Georgia Institute of Technology, Atlanta
ILLINOIS
The John Crerar Library, Chicago
MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge
MISSOURI
Linda Hall Library, Kansas City
NEW YORK
Columbia University, New York
PENNSYLVANIA
Carnegie Library of Pittsburgh
WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an "*" following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library
COLORADO
Denver Public Library
CONNECTICUT
Hartford Public Library
MARYLAND
Enoch Pratt Free Library, Baltimore
MASSACHUSETTS
Boston Public Library
MICHIGAN
Detroit Public Library
MINNESOTA
Minneapolis Public Library
MISSOURI
Kansas City Public Library
St. Louis Public Library
NEW JERSEY
Trenton Public Library
NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library
OHIO
Akron Public Library
Cincinnati Public Library
Cleveland Public Library
Dayton Public Library
Toledo Public Library
OKLAHOMA
Oklahoma County Libraries, Oklahoma City
TENNESSEE
Memphis Public Library
TEXAS
Dallas Public Library
Fort Worth Public Library
WASHINGTON
Seattle Public Library
WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 750 Third Avenue, New York, New York, 10017.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents, those identified by both the symbols "#" and "*", from: ESRO/ELDO Space Documentation Service, European Space Research Organization, 114, av. Charles de Gaulle, 92-Neuilly-sur-Seine, France.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

SPECIAL FOURTH CLASS MAIL
Book

POSTAGE AND FEES PAID
NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION
NASA-451

U.S.MAIL

POSTMASTER: If Undeliverable (Section 158 Postal Manual) Do Not Return

NASA CONTINUING BIBLIOGRAPHY SERIES

NUMBER	TITLE	FREQUENCY
NASA SP-7011	AEROSPACE MEDICINE AND BIOLOGY Aviation medicine, space medicine, and space biology	Monthly
NASA SP-7037	AERONAUTICAL ENGINEERING Engineering, design, and operation of aircraft and aircraft components	Monthly
NASA SP-7039	NASA PATENT ABSTRACTS BIBLIOGRAPHY NASA patents and applications for patent	Semiannually
NASA SP-7041	EARTH RESOURCES Remote sensing of earth resources by aircraft and spacecraft	Quarterly
NASA SP-7043	ENERGY Energy sources, solar energy, energy conversion, transport, and storage	Quarterly
NASA SP-7500	MANAGEMENT Program, contract, and personnel management, and management techniques	Annually

Details on the availability of these publications may be obtained from:

SCIENTIFIC AND TECHNICAL INFORMATION OFFICE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Washington, D.C. 20546